COAL AGE

Vol. 11 NEW YORK, JANUARY 27, 1917 No. 4

The Problem of Hiring Men

JUST NOW the cry of the coal operator is "Give me men." There is a 20 per cent. scarcity in mine labor, because many miners have left the collieries to work in steel mills, munition plants and other industries where business temporarily is booming and wages are high.

WHEN LABOR is plentiful how many companies really discriminate in hiring new employees? How many concerns employ a real system instead of a grab-bag plan of picking men to fill the ranks?

Why should men forsake the mines at the first opportunity? Would they leave so quickly if working and living conditions were satisfactory? Would the coal companies lose so many of their employees if they had paid attention in the first place to hiring the right kind of men and the proper sort of bosses to govern them? One fact stands out—the concerns that have done most to further safety, increase their men's comfort and make conditions and surroundings generally more cheerful, have lost the fewest men and are getting the greatest share of the present prosperity.

The pay-roll expenditure exceeds all other outlay. Why then attach so much importance to buying materials and give so little consideration to the purchase of labor?

Men are harder to judge than steel rails, hemp rope or mine cars, and they do not come "according to sample." What success would a company have if it argued that the simplest way is to try out a piece of equipment rather than make patient inquiry regarding the machine before deciding on its purchase. Yet in most cases that is the plan followed in the matter of hiring men.

The average new man must be broken in; the process pays only when a permanent workman is developed. The quality of the individual units determines the quality of the organization—and on this last depends the quality of the output and the reputation of the company. Trying out incompetents as a substitute for intelligent selection, earns for a concern a reputation for "easy and frequent discharge." Worth-while applicants fight shy of such companies, since every discharge is a black mark such as no steady, reliable worker desires entered in his record.

Any man worth hiring is worth interviewing. First impressions are not always dependable, for many efficient men lack the art of personal salesmanship. Individuals of long service are often embarrassed by the necessity of applying for a place, while the man of many jobs has learned how to present his wares in the most favorable light. The latter, however, when put at his ease usually becomes garrulous, while the competent workman takes the matter of his employment seriously, concentrating on that point, volunteering no irrelevant information and exhibiting the same fixity of purpose that he will display in tackling his work.

As a rule, it is well to avoid the man who is sweeping in his condemnation of the conditions at his last place. No degree of skill will offset the evil effects of a "knocker" in office or mine. If possible, do not take a man from a permanent occupation to fill a temporary job. The company that does so will have a bitter enemy before long. Make the fellow who asserts he can "do anything" prove his contention. Efficiency usually follows devotion to a specialty. Hesitate before employing the man who wants to know the length of the lunch hour, the details of the time-keeping system, etc.; he will develop into a mischievous critic.

The output of the healthy man is greater and its quality higher than can be obtained from the weakling. Such workmen are less liable to accidents due to fatigue or dulled faculties. Twentieth-century competition renders it impossible to hire men through sympathy. Thrift is a more certain indicator of steadiness even than possession of a family. The applicant who has property or a savings account comes well recommended.

No company should be party to a policy that beats down an applicant simply because he needs work badly. Any concern that capitalizes the misfortunes of its applicants will get what it deserves—inefficiency, disloyalty and dissatisfaction.

Ideas and Suggestions

Failure As a Business Asset

By Canadian Correspondent

Manuals on success, how to train the mind, furbish up the memory, exercise the will are common features of the business and educative literature offered the mining public. Sermons are preached on the accomplishments of great men, treatises are founded on the lives of the successful, volumes are written on the attainments of the powerful, but the things that are left unsaid are often of greater value than those that are published to the world. Success is an accomplishment, but failure was the factor that evolved success.

A man may give with relish the principles on which he built the foundations of his rise and progress, but seldom does he reveal the ineffectual efforts he made in earlier days, the why and the wherefore of the many failures that went before success and the inward meaning of the experience that he gained from failure. More is to be learned from our failures than from our successes.

If we know why we failed in this or that enterprise, and if we have taken that lesson to heart, we have gone a long way toward success. For we have learned to avoid certain combinations of circumstances that make for failure. Conversely, by doing so we enter without effort into accomplishment. Through failure we have learned our limits; we know what we can do and what we cannot do, how much we can rely on ourselves and how much we require the help of others. In early youth we can do most things badly, in later life we can do one thing well; and what is better, we know we cannot carry out others. Failure and not success enables us to learn that.

Failures Which in the End Spell Success

Failure is a better polisher of character than is success. The man who can stand failure with courage, who can face the troubles involved calmly and with the certainty of turning them to later account, has a finer and stronger character than the merely successful man.

Two young men were candidates for an executive position. One had been successful all his life. At college he had passed all his examinations easily and apparently without effort, and thereafter everything that he had done had been done well. Steadily he had risen from post to post in one straight line until he stood next to the head executive.

The other was a failure. At college he had barely passed his examinations, and only after extra coaching and a hard struggle. Afterward he had traveled from place to place, in each new position meeting conditions he never seemed able to overcome. Here it was a strike of workmen, there a business attempt of his own, a railway line that could not earn expenses, a mine that failed to return dividends. With it all, however, he kept his poise, accepted the knocks and tried again.

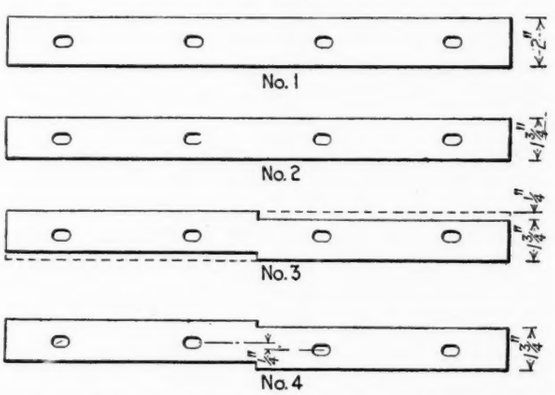
The executive chose the hitherto successful man to fill the position, and within a year he experienced his first failure and went to pieces. His success had been built upon his own ability to do the work before him and do it well, but when he was placed face to face with the necessity of securing success where conditions were largely controlled by others, he could not organize a winning campaign. The unsuccessful man was then given a trial. He rose because he knew his limitations; he knew how much to delegate to others and how much to do himself. His experience enabled him to judge other men. He could foresee difficulties before they came and could arrange in time to meet them. He knew these things, because they had been burned into his brain by failure. The other man, who had always succeeded, did not know them because he had never encountered the need for them.

Take heart then if you fail. Failure is no disgrace provided you try your best. There are few successful efforts in this world that have not been based upon previous failures. From those unfortunate experiences comes the success that counts.

Leveling a High Joint in Shaft Rails*

By S. Ford Eaton†

One of the trials of the trackman in mines using incline shafts and having acid water is the high joint. In spite of his vigilance drip will find its way from the timber to the ball of the rail. A surprisingly short time is required by the constantly dropping water to cut away enough of the rail to give the skip quite a bump. Then it is up to the miner to put in a new length of rail. Corrosion in this class of mine is rapid and, combined with the wear of the skip wheels, will cut down the height of the rails considerably in a few months. When a new length of standard dimensions is put in, a high joint results. Assuming that the difference in height is ¼ in., the illustration shows the right and wrong type of



THE EVOLUTION OF A FISHPLATE TO LEVEL HIGH RAIL JOINTS

*From "Engineering and Mining Journal."
†Foreman, Vantrent Mining Co., Vantrent, Calif.

fishplate with which to remedy the trouble. No. 1 is the standard fishplate 2 in. wide. Nos. 2 and 3 were failures. No. 2 is a plate made of strap iron 1¾ in. wide, all holes bored in the same line. No. 3 is a standard plate with a ¼-in. cut half the length of the plate removed from diagonally opposite portions of the edges. When Nos. 2 and 3 were used, a metal or wooden shim ¼ in. thick was placed under the lower rail. No. 4 will do the work. It is made of strap iron 2 in. wide and cut the same as No. 3. Holes are bored so that the lines of centers in each end are ¼ in. apart. No shim is necessary.

Single- or Double-Ply Belts?

By T. W. Schaphorst*

Double belts cost approximately twice as much as single belts of the same width, but they do not transmit twice as much power. Naturally, this gives the single belt the advantage in many cases, as it justly should. Yet I have never known this cost relation to be considered in the selection of a belt drive for a given purpose.

Usually the designer looks over his plans, and if it "seems" that a double belt should be used, he specifies such equipment without first making comparative computations. If the power to be transmitted is small, if the drive is unimportant and costs must be as low as possible, the designer usually "guesses" that a single-thickness belt will be "good enough."

To illustrate the point and thereby make it more emphatic, let us take a simple case where 50 hp. is to be transmitted from a 4-ft. pulley to another 4-ft. pulley, the distance between shaft centers being 30 ft. I am a believer in large pulleys, in most cases, and in high belt speeds. Large pulleys do not permit belt slippage as readily as do small ones, are often more economical because they permit the use of narrower belts, and the pulling stress on the shafting is correspondingly less. So, all in all, large pulleys and high belt speeds generally make the most efficient and economical combination. We will therefore use a belt speed of a mile a minute, which is permissible with good cast-iron pulleys. At that speed each inch in width of single belt will transmit $5280 \div 800 = 6.6$ hp., and each inch in width of double belt will transmit $5280 \div 500 = 10.56$ hp.

From this we find that the single belt will have to be 8 in. $(50 \div 6.6)$ wide and the double belt 5 in. $(50 \div 10.56)$ wide. These will require pulleys with 9- and 6-in. faces respectively. The costs of these pulleys to the trade are $14.60 and $13.30 respectively for one, or $29.20 and $26 for the pair. The pulleys for the single belt will therefore cost $2.60 more ($29.20 — $26.60), which is not very much considering the size of the drive. This will be more than counterbalanced by the money saved through using a single belt instead of a double one.

It is clear that the length of belt required in this case will be $[(2 \times 30) + 4\pi] = 72.5$ ft. Now, since all belting catalogs give prices on belts per foot for all standard widths, we can easily arrive at the costs of the respective belts. I find that the single belt will cost $62.30; the double belt $78.40. The double belt will thus cost $78.40 — $62.30 = $16.10 more. The overall saving through the use of the single belt will therefore be $16.10 — $2.60 = $13.50, which is certainly worth considering.

It is evident that the greater the distance between shaft centers, the greater will be the saving with single belts. But where the distance is small, the difference in cost is slight; and at certain distances in any drive the costs will be equal mathematically. Practically, however, such distances are often impossible, as in the example just cited where I get a distance of —0.4 ft. as that at which costs would be equal. I do not know how such an arrangement would look, nor does anybody else, for I have never seen shafts set at a "negative distance" apart. I get a negative result here because the excess cost of the double belt required in merely wrapping around the 4-ft. pulley would alone be more than $2.60—the pulley saving.

The double-thickness belt has an advantage where space is expensive, of course. Often a single belt might cause additional expenditures, owing to its greater width, in which case such expense must be considered. It would hardly be good practice, for instance, to use a wide single belt for the sake of economy and at the same time make the sheltering building a foot or so longer just to house the belt. Usually, however, we are not so cramped for space and can use either a double or single belt, or we can use a three-ply belt if our judgment and computations justify its employment.

All these little things should always be considered, especially where a large number of belts and pulleys are used. Good single-thickness belts give excellent service when they are properly cared for. Double belts need not be used simply because it "sounds" better to say to visitors, "Our drives are all equipped with double- and triple-ply belts; we haven't a single-ply belt in the house."

The drive that is ultimately the most economical is *always* the one to be used.

*New York, N. Y.

Acid-Resisting Suction Hose

By R. L. Mathews*

In operating a portable mine pump where the water was extremely acidulous, it was noticed that the ordinary cotton fire hose used on the discharge end of the pump would last twice as long as the various kinds of reinforced suction hose tried. An expensive brand of metallic hose was eaten away by the acid in less than four months, and a rubber-lined reinforced cotton hose met the same fate in less time. In fact, it was found necessary to carry an extra length of expensive suction hose constantly on hand to make necessary replacements.

It was finally decided to experiment with the variety of hose carried in the warehouse for fire protection, which was doing good service on the discharge end of the pump, and devise some way to reinforce it to prevent its collapse when used as a suction hose. With this end in view, some ordinary telephone wire was wound on the lathe over a pipe to give a coil having slightly less diameter than the hose. The coil was inserted in the hose, and the suction line thus constructed was tried out.

This was found to give excellent results. The first installation lasted more than twice as long as any of the expensive suction hose. Furthermore, a replacement required only the proper length of fire hose with the same coil of wire inserted again.

The increased friction due to the exposed coil made no appreciable difference in the efficiency of the pump.

*Santo Tomas, Tex.

Line and Return Troubles in the Haulage Systems of Coal Mines*

By I. Rowland Brown†

SYNOPSIS—Some of the requirements of good power- and trolley-line construction, including the defense against lightning and surges, the advantages of suspended trolley-wire construction and like subjects. Losses due to the poor bonding and the method of testing such bonds. Tables and diagrams showing the cost of such losses and the degree of efficiency with bonds of a given size. Maintenance department should make repair squad less necessary.

That catchy advertising phrase "Do it Electrically" is particularly significant in these days because we have just arrived at a time when electrical service can be secured at a price so low and of a character so reliable that electricity has become the most efficient form of power. This advance is due principally to the large central station and its transmission system. The sooner we realize the value of this new servant of the industry the greater will be the advance of the electric art.

Electric power has hitherto been generated in most cases in isolated plants, but the central station has been coming rapidly to the front in big cities and manufacturing centers, and we are now witnessing the installation of large central stations at points where power can be generated at the lowest cost. That point may be near a waterfall in the wilderness or in a thinly settled district where cheap fuel is obtainable. High-voltage transmission has made the choice of such desirable locations feasible by furnishing the means of transmitting the power to the industrial center.

*Paper entitled "Electric Haulage in Mines," read before the Kentucky Mining Institute, at Louisville, Ky., Dec. 8, 1916, and before the West Virginia Coal Mining Institute, at Huntington, W. Va., Dec. 13, 1916.

†Mansfield, Ohio.

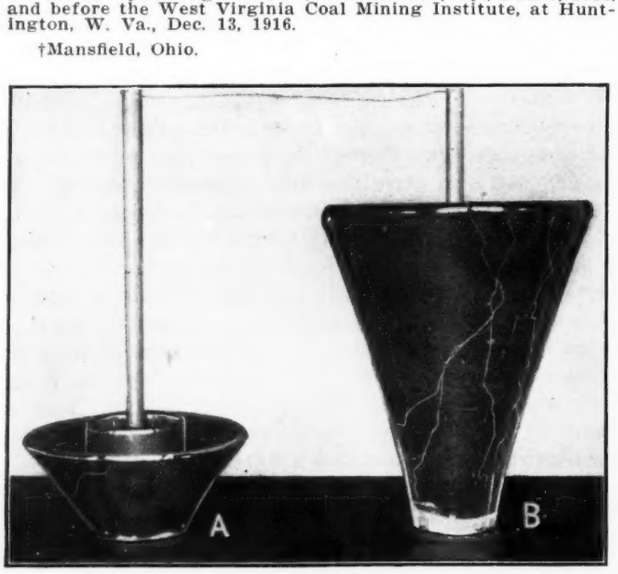


FIG. 1. ILLUSTRATES THE VALUE OF THE SMALL INSULATOR

The small insulator A permits the surges of the line and lightning to pass around it through the air. The gap afforded by the large insulator B is so large that the heavy discharges pass through the insulator and destroy it

The isolated mining plant can transmit electric power one or two miles at 250 volts or four or five miles at 500 volts, but the central station may transmit its power over 200 mi. at 100,000 volts or more; a line is being planned in the West to operate at 200,000 volts and the ultimate high voltage and economical distance of transmission have not yet been reached. The possibility of locating at a waterfall or in a center of cheap fuel, coupled with the increased efficiency of a large generating unit over a small unit and the efficient modern methods of transmission, has made it possible for the large central station to sell electric power to your mine cheaper than you can generate it in your isolated plant. As long as there is a great demand for coal, the cost of fuel at your isolated plant will be what you can sell the coal for at the tipple and not the flat cost of mining it, as many have figured. Purchased power has so many points of advantage besides its low cost that it will be the power of the future in the mines, except in special cases or in districts where a central station is impracticable.

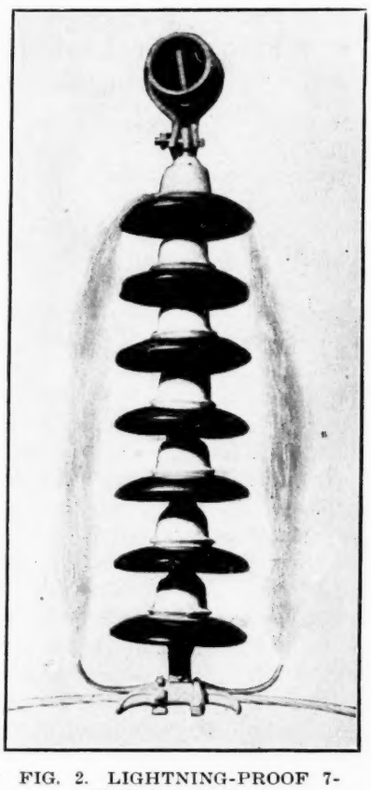


FIG. 2. LIGHTNING-PROOF 7-UNIT INSULATOR

Heavy discharges which would destroy these insulators pass in free-air arcs on both sides

The contingency of shutdowns due to interruptions in the service has been one of the main objections to purchased power in the past, owing, no doubt, to the difficulties encountered in the early days of high-tension transmission. The transmission engineers have made such a careful study of the difficulties they encountered that today, as a result of their past experience, they design and operate high-tension transmission lines over relatively great distances with fewer and shorter interruptions of service than can be shown on the log of the best isolated plant.

The transmission line has been wonderfully improved in the last few years, and although at one time we considered it impossible to construct a line that would be free from lightning disturbances, now it is possible to so insulate and protect a line that few interruptions from lightning are likely to occur. Great strides have been made in the manufacture of porcelain, the universal

material for high-tension insulators, so that now it can be considered as thoroughly reliable and uniform a material as iron or steel.

Efficient design, coupled with uniformity of quality, has produced insulators that have a satisfactory factor of safety against puncture and will discharge to the ground through a relatively short protecting air path, which acts virtually as a safety valve and discharges the electricity before the porcelain insulation is subjected to a dangerous stress. Careful design of towers and insulators now eliminates bird and squirrel troubles, which have been the causes of a great many interruptions of service in the past.

No Longer Design Lines for Work To Be Done

The best transmission lines are no longer designed for the line voltage alone, but are insulated against lightning and high switching surges which may be many times the voltage of the line, and of a very different wave length and frequency. The difficult problem of insulating dead ends where the mechanical load is high, such as in long river spans, has been worked out on new lines in a most satisfactory manner.

These advances in transmission-system design have made it possible to distribute power in great quantity and over great distances at a low cost and with the highest degree of reliability, giving a continuity of service that was at one time thought impossible.

The mine-haulage problem is fundamentally the same as that of the electrified railway, but, of course, differs in details because of the limitations of the mine. Reliability is just as important for a mine as for a railway, but the conditions are somewhat different, for almost all electrified railways depend upon a high-tension transmission line for their power.

You will always notice on well-operated electric railways that the overhead construction is of a high class both as regards the materials used and the workmanship. Cheap materials and temporary or careless construction have caused serious financial losses to many electric railways. High quality in materials and installation, coupled with careful and untiring maintenance, is the only way to insure reliability and low cost of operation.

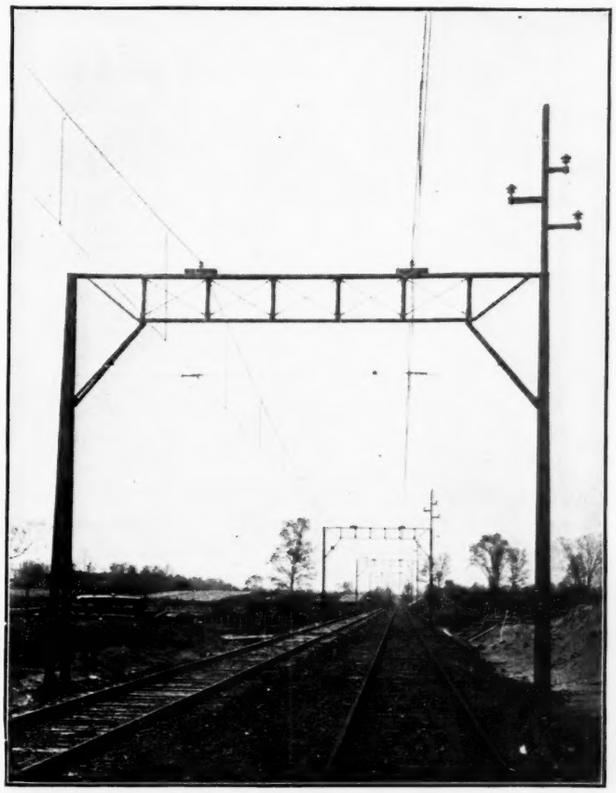


FIG. 3. FLEXIBLE OR CATENARY TROLLEY-WIRE SUSPENSION

On Northfield cutoff of Northern Ohio Traction and Light Co.'s railroad near Akron, Ohio. An unyielding trolley wire is not desirable where, as in all surface lines, it can be avoided

From what I have seen, the mines are more serious offenders in this respect than the railways. Even where they purchase the best materials they put up too much temporary work that remains so long that it becomes permanent construction. There is, of course, a need for some temporary construction, but it should be put up in just as workmanlike a manner as the permanent and differ only in the design or layout. The word "temporary" is too often only an excuse for poor and inferior work.

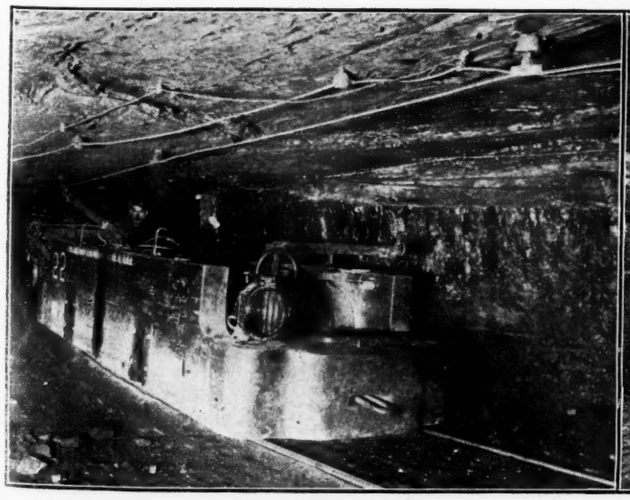


FIG. 4. POOR LINE WORK HAS BEEN DONE HERE, THOUGH HEADING IS STRAIGHT

Note the low trolley-line ear under the trolley wheel, the high one near-by and the one on the right which is not set true with the trolley wire. Poor use was made of a good opportunity

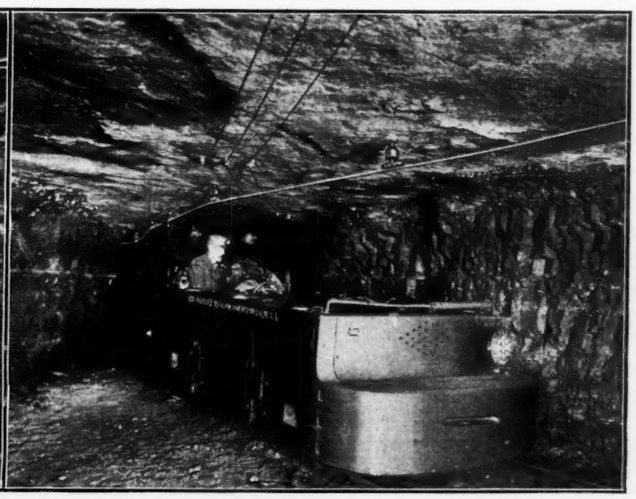


FIG. 5. WIRING IN THIS UNITED STATES COAL AND OIL CO.'S MINE IS BETTER

Note that all ears hold the wire in the position which it would naturally assume except in places where the twisting of the heading makes a change of direction necessary

Too much mine work is "just put in" without any previous designing, but it is the cheapest and best plan to make a drawing and bill of material of all installations before starting the work and then carefully file these

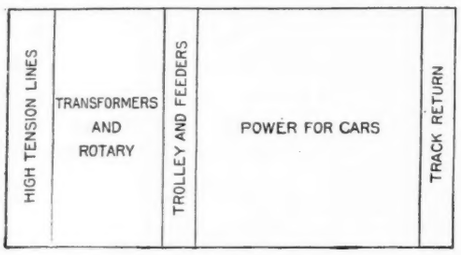


FIG. 6. DIAGRAM SHOWING HOW POWER IS USED AND WASTED

Only 50 per cent. of the power developed at the station is actually used to haul the cars in the mine

drawings for future reference. This method almost always results in better work and helps to maintain those standards which are necessary for efficient operation.

On electric railways, where a wheel and pole are used for current collection, one of the main considerations in the design of the overhead construction is flexibility. Where a pantograph is used as a collector, there is some difference of opinion; but for mine service with wheel collectors a certain degree of flexibility or resiliency in the trolley wire would make without doubt better current collection and would reduce the wear on trolley wheels, trolley and supports. In most mines the lack of head room has made it hard to provide this flexibility and in many cases it is entirely overlooked. A 4/0 trolley wire held by rigid supports on tangents at every 20 ft. and on curves at every 10 ft. makes an excessively rigid trolley, even without any tension in the wire. On curves flexibility is needed more than anywhere else, and it is here that the usual mine construction has the least. This is a real problem in mine haulage and although

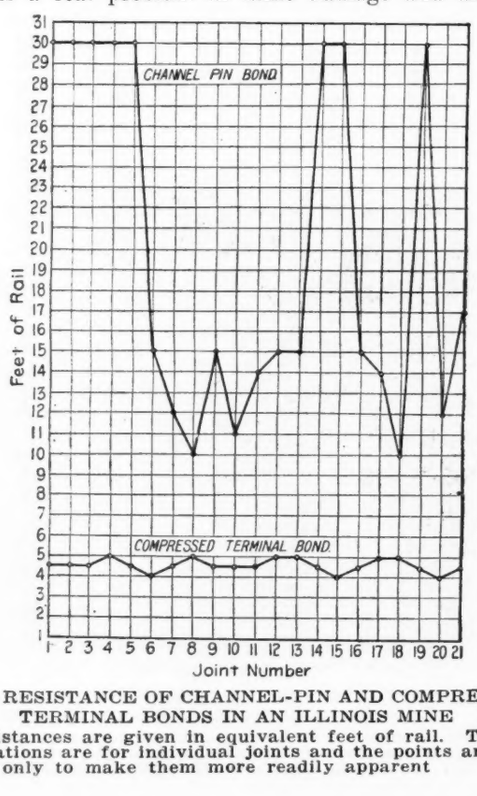


FIG. 7. RESISTANCE OF CHANNEL-PIN AND COMPRESSED-TERMINAL BONDS IN AN ILLINOIS MINE

Resistances are given in equivalent feet of rail. The determinations are for individual joints and the points are connected only to make them more readily apparent

some work has been done, there is much opportunity for development in this direction.

One of the many problems in mine haulage that is continually before us is that of maintaining and balanc-

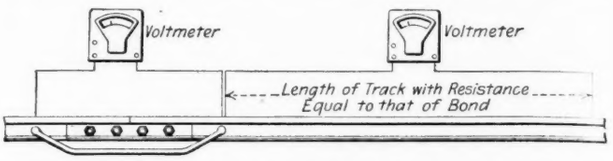


FIG. 8. METHOD BY WHICH THE RESISTANCE EQUIVALENTS IN FIG. 7 WERE SECURED

ing the feeder system and the return circuit. It is unfortunate that any distinction has arisen between the feed and return sides of the circuit, because there is no difference electrically.

In early days it became the practice to pay little attention to the return through the ground on grounded systems, and whenever a circuit showed low voltage under load, at a distance from the power house, more copper was hung in the air to increase the carrying capacity and lower the resistance of the feed side. Many thought that the ground being of unlimited extent would have low resistance and unlimited conductivity, but that is not true and the return side of the circuit must be as carefully calculated and maintained as the feed side if the best results are desired.

Maximum voltage will be secured at the end of a line under load when the conductivity of the circuit is equally divided between the feeder and the return. When this ideal condition exists the power loss in the feeder is equal to the loss in the return; however, this balanced condition may not always be the most economical arrangement.

Experience has shown that low voltage at the end of a haulage line under load is more frequently due to a poorly bonded return than to lack of feeder, and there seems to be a tendency among railways and mines to spend money for copper and for the best of workmanship on the feeder side of the circuit but to hold up any expenditure for the improvement of the return. Money is frequently spent on the feeder system that would have netted several times the earnings if expended in good bonding on the track side of the circuit.

Fig. 6 is a diagram of the distribution of the energy for an electric haulage system, buying high-tension alternating current and operating with low-voltage direct current. The energy actually used in the locomotive for hauling cars is only one-half of the total on a well-planned system and many systems are far less

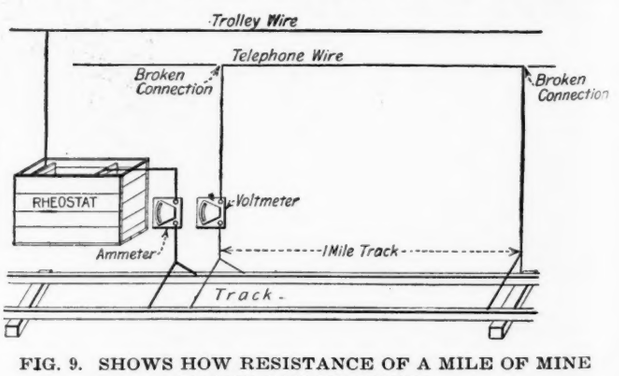


FIG. 9. SHOWS HOW RESISTANCE OF A MILE OF MINE TRACK CAN BE FOUND

economical. The quantities of power consumed by the feeder and by the track return are each shown at about 7½ per cent. in the diagram. To obtain good results, the return through the rails must be carefully maintained by efficient bonding; and here is where the greatest difference of opinion exists. All bonding is a compromise between what we would like to get and what is practicable under the existing limitations. It is safe to say that any bonding gang now working can do better work than it is doing; and it will pay them to do better work. Fig. 7 shows the plotted results of a test on some joints in an Illinois mine. The upper series of points shows the results secured with channel-pin bonds, the resistance being expressed in terms of the resistance of equivalent feet of rail. The equivalent lengths varied from 30 ft. to 10 ft. and averaged 20 ft. The lower series shows the results on compressed terminal bonds installed for the same length of time and the equivalence lies between 4 and 5 ft., the average value being equal to 4½ ft. of rail.

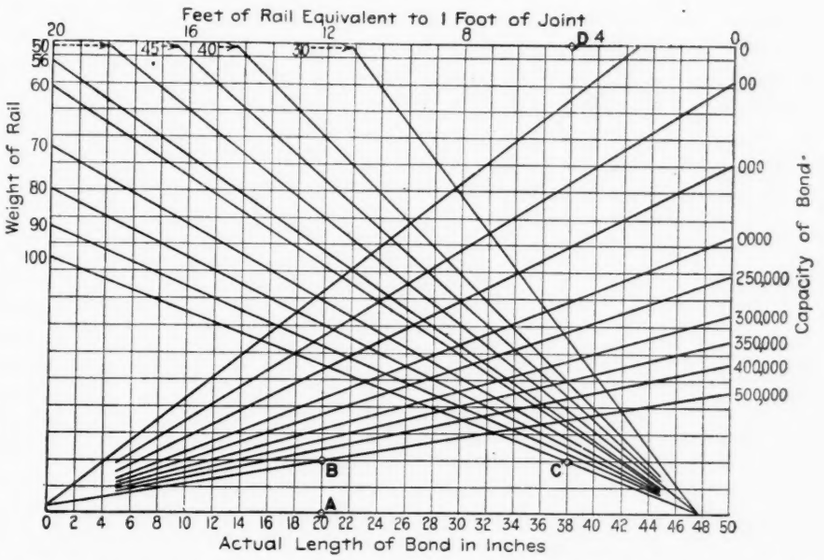


FIG. 10. DIAGRAM SHOWING WHAT RAIL LENGTH HAS SAME RESISTANCE AS BONDS OF DIFFERENT LENGTH AND DIAMETER

For instance, a 20-in. bond of 500,000 circular mils will have a resistance equivalent to 4.8 ft. of rail weighing 100 lb. per sq.yd. This can be seen by following the lines A B C D

Table I is a portion of a larger tabulation for figuring the loss in dollars per joint each year, for given power costs, when the resistance of the joint expressed in feet of rail is known. The cost of the power per kilowatt-hour is the cost on the trolley, and will be greater than the cost at the power house if there is any great distance for transmission.

TABLE I. SHOWING COST OF POOR BONDS

Resistance of Joint in Feet of Rail	Cost of Power per Kw.-Hr.	Loss per Joint 30-Lb. Rail	40-Lb. Rail	45-Lb. Rail	50-Lb. Rail	60-Lb. Rail
14	½	$0.1148	$0.0871	$0.0773	$0.0696	$0.0581
	1	.2296	.1743	.1547	.1393	.1162
	1½	.3494	.2614	.2320	.2089	.1743
	2	.4595	.3486	.3094	.2786	.2324
	2½	.5740	.4357	.3267	.3482	.2905
	3	.6888	.5229	.4641	.4179	.3486
16	½	.1312	.0996	.0884	.0796	.0664
	1	.2624	.1992	.1768	.1592	.1328
	1½	.3936	.2988	.2652	.2288	.1992
	2	.5248	.3984	.3526	.3184	.2656
	2½	.6560	.4980	.4420	.3980	.3320
	3	.7870	.5976	.5304	.4776	.4084

The table is figured on a basis of 100 amperes of average current in each rail and 5000 hr. per year. If the average current per rail is 200 amperes, multiply the result by 4; for 300 amperes multiply by 9 and for 400 amperes multiply by 16. To get the loss per mile multiply by 360, which is the number of joints in a 30-ft. rail, allowing 10 per cent. for short lengths. A joint resistance equivalent to that of 16 ft. of 40-lb. rail, with power at 2c. per kilowatt-hour, means a loss of 40c. per year for each 100 amperes to be carried by the rail, $1.60 for 200 amperes per rail and $3.60 for 300 amperes per rail. This loss is for each joint and from these figures the reader can easily determine when rebonding will pay for itself. The average current can be found by cutting a recording ammeter into the circuit and using an averaging machine on the charts. Fig. 8 shows one method of finding the resistance of the joint expressed in feet of rail and also of picking out the good and the bad joints along the roadway. This scheme consists of connecting one side of a duplex millivoltmeter across the joint and the other side across a section of the rail. When the two needles of the millivoltmeters have the same reading, the length of the rail in the right circuit expresses the equivalent resistance of the joint.

As current must be flowing in the rail to give good readings on the instruments, the best plan is to operate a locomotive ahead of the tester. It is the practice on many properties to adopt an arbitrary length of rail and state that all bonded joints equivalent to this length or less are good, and all running over are bad or sufficiently bad to require attention.

For a number of years 3 ft. was a standard, but some use 4 ft. or 7 ft. Such an assumption has no significance and in many cases is entirely wrong. The number of feet of rail equivalent to a bonded joint when that joint

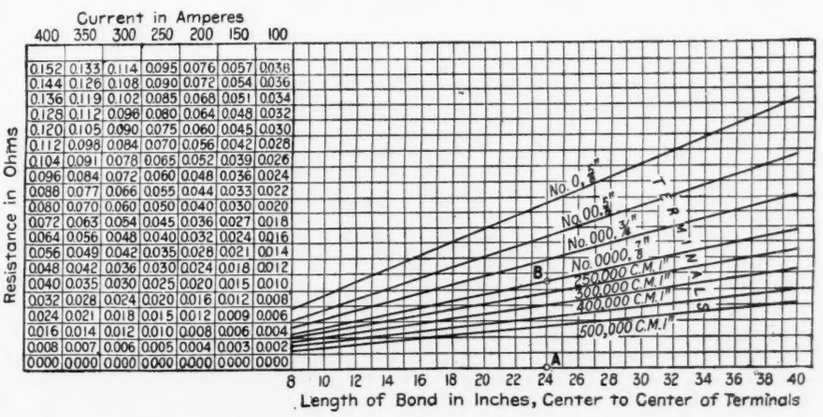


FIG. 11. RELATION BETWEEN LENGTH AND SIZE OF BOND, CURRENT CONVEYED AND RESISTANCE

Thus, a 24-in. bond (see A) of 410 capacity (see B) has a resistance to 100 amp. o current of 0.0010 ohms, and of 0.040 ohms to a current of 400 amp.

is perfectly bonded will depend on the length and capacity of the bond and the cross-section or weight of the rail, and can be accurately determined. Fig. 10 shows a diagram for arriving at the equivalent length of rail for a particular joint when the bond is first installed and the conditions are ideal. (This diagram was prepared for electric railway work and does not show the smaller sizes of rail used in mines.)

This diagram can also be used to determine the correct size of bond to use when the allowable "feet of rail equivalent to one foot of joint" is known. In all mines tables should be prepared giving the equivalent feet of rail for each weight of rail and size of bond for ideal installation and the correct quantities to be used when making tests.

Another method of testing the track return is to simultaneously measure the current flowing and the voltage drop over a considerable length of track by using a disconnected feeder or telephone wire as one lead of the voltmeter, as shown in Fig. 9. From these readings the actual resistance of the track return in ohms can be found, and the difference between this and the calculated resistance for good bonding will show the loss and also the opportunity for improvement. Fig. 11 shows a diagram which gives the size of bond that will produce a certain drop per joint for a given current flow and is useful in checking existing conditions or in laying out new work.

Maintenance More Important Than Repair

It is highly important that frequent tests be made of the return circuit and the correct bond determined by calculation and not by guess. It is not possible to select a bond by calculation alone, as there are so many local conditions to be considered; but the calculations should be made and then only such changes introduced as are absolutely necessary. There is no way to figure the distance between crossbonds, but it is customary to make this distance 200 ft. in mines and 500 to 1000 ft. on electric railways. For crossheadings and temporary tracks, it pays to install a high-grade renewable bond rather than a piece of wire and channel pins.

There are other losses due to poor bonding in addition to the heat loss in the rail return, but they are not easily expressed in dollars. (a) On low voltage, motors overheat because they take so much more current and the heating increases as the square of the current. In actual tests on a 10-ton locomotive, the current doubled, thus producing four times the amount of heat, all of which had to be dissipated. (b) Motors are less efficient when operated under low voltage. (c) The number of cars hauled per trip can be greatly increased by maintaining a good return and high voltage. In one mine a locomotive stalled on a grade with 13 cars when the track was bonded with channel pins and wire, but the same locomotive later hauled 39 cars up the same grade when the track had been rebonded with equivalent sizes of compressed terminal bonds.

We are continually hearing about "Safety First" and "Prevention," and there is no place where these slogans carried into practice will bring greater financial returns than in the operation of mines or railways. For the moral effect on employees and yourselves, do not have a repair department, but call it the "service" or "maintenance department and expend labor and supplies in provident upkeep rather than in excessive repair."

The steam railway has a maintenance-of-way department. It does not wait until a track bolt falls out of a splice to renew the connection. It has track walkers who inspect all joints each day and make sure that the bolts are tight. The well-conducted railway does not run a locomotive until it breaks down and then send it to the shop for repairs, but it is sent to the roundhouse at the end of each run and inspected and kept in operating condition. In a modern factory the manufacturer does not wait until devices are finished before inspecting them, but the inspectors watch each step in the manufacture and catch mistakes before they go too far.

All these forms of prevention cost money, but they save many times their cost. There are mining companies that make systematic inspections and records of all materials and machinery and they find that the practice pays. They test every rail joint and all hangers once a month and keep a record, so that if a bad bond is not replaced within the month it shows up again on the next test and there is trouble for the bond man. It pays to have servicemen who go over all machinery and tighten loose bolts before a breakdown occurs or fix up the insulation before it cuts through, causing a ground, and perhaps a serious shutdown. If this service plan is carried out, the old repair shop will not be overcrowded, there will be fewer and shorter shutdowns, and the cost of operation will decline.

Shaft Sinking by Freezing Revived

Shaft sinking by the freezing process was carried on at least as far back as 1862, but of late years the method has fallen into disuse. The *Engineer* describes a recent application of the freezing process at the new Llay Hall colliery, Wrexham, England. Both the upcast and the downcast shafts—270 ft. apart—which were originally giving off large feeders of water, have been carefully treated and the brickwork made quite dry. The only water that now has to be disposed of comes from the underground workings. The difference in level between the stratification of the two shafts is about 40 ft., corresponding to a dip of 17 deg. from No. 2 to No. 1.

At first, two foreshafts were sunk 12 ft. deep and 31 ft. in diameter and lined with brickwork. Concrete was placed on the bottom after inserting straight vertical guide tubes for 25 boreholes distributed around a circle 26½ ft. in diameter. In the upper strata the holes for the freezing tubes were bored by the rope method, but in the lower and harder ground percussion apparatus operated by a steam cylinder was used.

The cold necessary for freezing the water-bearing ground was applied by two distinct groups of machines. The pipes and valves were arranged so that either group of machines could operate on either shaft or on both simultaneously. Each included a belt-driven ammonia compressor with an independent horizontal steam engine having cylinders 16¾ in. in diameter and 30-in. stroke. A solution of calcium chloride was used as the freezing liquid and was caused to circulate between the refrigerators and the freezing tubes by means of two plunger pumps. The brine pipe between plant and shaft was insulated with hair felt.

The ground was frozen to a depth of 231 ft. in the first and 235 ft. in the second shaft. The diameter of the pit shafts after lining is 18 ft.

Smallest Mine Shaft in the World

SYNOPSIS—The small shaft sunk at an armory in Scranton in order that workmen might be enabled to reach the abandoned mine workings below and reinforce the inadequate pillars with masonry furnishes a remarkable suggestion for the manner in which rescue holes can be provided in mines. The method of surveying the workings and of supporting the armory is briefly detailed.

The borehole from the surface at the 13th Regiment Armory, in Scranton, Penn., is 2 ft. in diameter; yet down it men, timber, powder and mortar have been lowered and from it considerable work has been done. Fig. 5 shows two men being hoisted at one time. It would seem that a hole no larger than this and one perhaps even smaller, might prove a godsend if connected with a rescue chamber in the mines. Of course, so small a hole was not dug with pick and shovel. It was drilled with a churn drill, the contractors being the A. W. Drake Drilling Co., 712-713 Markle Bank Building, Hazleton, Penn. The depth of the hole is 142 ft. It was laid out to come immediately in a pillar, so that when the drill approached the seam—the Clark—it did not cause a big fall of roof into the old workings. The Clark coal is from 7 to 8 ft. thick and only about 20 per cent. of the bed had been left in.

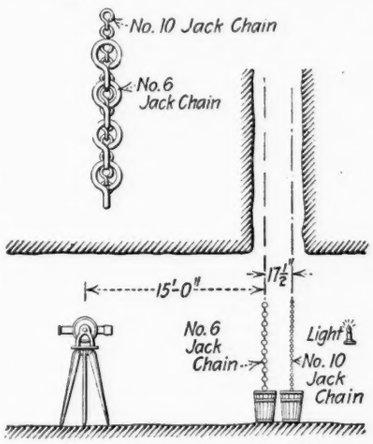


FIG. 1. SKETCH SHOWING METHOD OF SUSPENDING PLUMB BOBS

The borehole was remarkably straight, proof of which is that it was possible to suspend two plumb lines 17½ in. apart. This was the means of carrying the survey underground. It was found that with such a short base the ordinary plumb-line wires were out of the question, so a special method was developed of accurately prolonging this line. This is shown in Fig. 1.

The 15-lb. plumb bobs were suspended by ordinary iron stove-pipe wire, except for about 2 ft. above the bobs, where in one case a length of No. 6 jack chain was used and in the other case a section of No. 10 jack chain. The plumb bobs were of course immersed in buckets of water. The instrument was set up 15 ft. from the plumb lines; and as the bobs with the chains rotated, the opening in each link went through a complete circle. Since the two halves of each link were at right angles to each other, when one opening changed to an ellipse, then to a narrow slit and finally vanished completely, the opening of the other link was changing from a narrow slit to the full opening.

A light was held behind the No. 10 chain so that the instrumentman could see its links through the links of the No. 6 chain. By catching the light through the narrowest slits of both chains simultaneously it was possible to line in the instrument with great accuracy. From this line prolonged, the underground traverse system shown by the dotted lines in Fig. 4 was established.

Built to Pillars with Mortar from Shaft

The armory, to save which this pigmy mine shaft was sunk, cost the state about $300,000. To prevent it from becoming a useless ruin, 70 masonry pillars were built in desirable places to reinforce the coal, as shown in Fig. 4. These were placed so as to supplement so far as possible the pillars remaining. The rock for these masonry pillars was gathered up from the old workings. The stones were laid up in cement mortar as tightly against the roof as possible, and judging from the present cracked condition of some of the stones in these columns they were not long in assuming a part of the roof load.

Taking the site of the armory as an independent unit, a cover of rock 150 ft. thick would exert a pressure of 22,500 lb. per sq.ft. If this pressure is concentrated on about 20 per cent. of the area, as is the case in these old workings under the armory, the unit pressure is five times as great, or 112,500 lb. per sq.ft. = 56.25 tons per sq.ft. The masonry pillars probably do not add more

FIG. 2. WORKINGS UNDER ARMORY BEFORE NEW SUPPORTS WERE ADDED

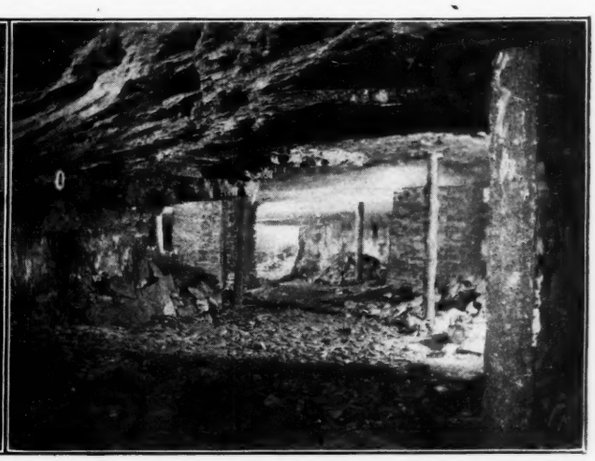


FIG. 3. LARGE CHAMBERS, SHOWING CRUMBLING PILLAR OF COAL ON LEFT

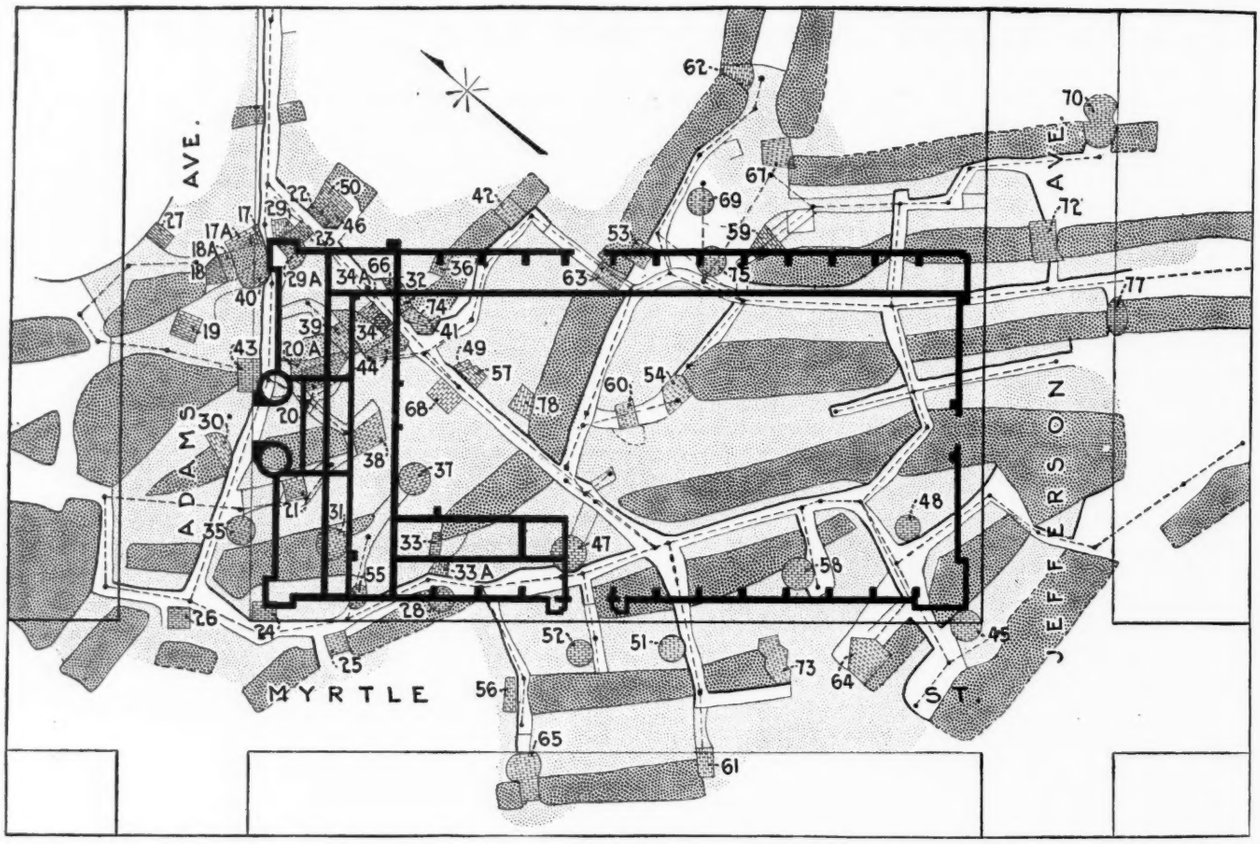


FIG. 4. PLAN OF CLARK COAL SEAM UNDER SCRANTON ARMORY, SHOWING THE PILLARS OF COAL AND ALSO THE MASONRY PILLARS AND GOB WALLS THAT HAVE BEEN ADDED

Dark portions are pillars of coal; brick-like portions are masonry walls and lightly tinted portions are gobs

than 5 per cent. to the area, so that the pressure must still be in the neighborhood of 45 tons per sq.ft.

The space between and around the masonry pillars is filled to the roof with hand-placed stone and débris—gob, as it is called—but this will not come into play as a column until some squeeze or settlement has occurred. All visible pillars have painted numbers, and the passageways are to be left open permanently, so that it will be possible to make inspections of the underground conditions.

Coal Age is indebted to *Engineering News* for these illustrations and the preceding information.

FIG. 5. MINE CAGE WITH TWO MEN ASCENDING 24-IN. BOREHOLE

FIG. 6. MORTAR BUCKET AND TRAM CAR AT BOTTOM OF BOREHOLE

Latest Improvements for the Preparation of Bituminous Coal—A Discussion

By H. Reisser*

SYNOPSIS—Some exceptions are taken to statements made in an article printed in a recent issue of "Coal Age." The writer believes that a slow-moving apron offers much better facilities for picking coal than does a reciprocating screen.

Warren Roberts' paper on improvements for the preparation of bituminous coal, delivered before the West Virginia Mining Institute in December, 1916, and published in *Coal Age* of Jan. 6, page 4, is very interesting—especially with reference to the comparisons made and the illustrations shown contrasting the standard shaking and picking equipment for large mines with the Marcus screen and picking table.

I do not wish to place myself in the light of criticizing either of these equipments. In justice to the manufacturers of other apparatus, however, and as an indorsement of the judgment of coal operators who have recently installed devices other than the Marcus screen, I believe that Mr. Roberts' article should not be passed by without a general analysis and a presentation of facts in defense of those who have seen fit to decide, after thorough investigation, that a standard shaking screen equipment is the preparation apparatus best suited to their particular problem, all things considered.

Fig. 1 of Mr. Roberts' article shows a weigh basket, a feeder hopper, an inclined shaking screen (together with provision for boiler coal) and a loading chute. It would thus appear that this tipple was designed to meet someone's particular ideas; and instead of being a standard, as referred to by Mr. Roberts, it is strictly special to the particular mine for which it was intended.

Coal-Breaking Equipment

It has been contended by a number of engineers that a dumping hopper and a reciprocating feeder between a weigh box and a screen of any type is only a coal breaker, and should not be tolerated under conditions where the preparation of a large percentage of lump, egg and nut is the object sought. The majority of the tipples in Illinois do not contain, nor will the managements countenance, the use of these two units.

Of course the boiler-house coal bin and the dump hopper and feeder add considerable to the height of the tipple. This results in long run-of-mine chutes, with consequent long runs for the coal and unavoidable breakage. There are other ways, however, to meet these requirements without this sacrifice in broken coal.

The standard method of loading lump, egg and nut into cars by means of a moving apron is not only ideal from a loading standpoint, on account of its slow movement, but it offers the best possible opportunity for cleaning the coal thoroughly, since the picker can see every piece of refuse long before it reaches him and can govern every move of both hands to the best advantage.

*Chicago, Ill.

The coal, in dropping from the end of the shaking screens onto the loading booms, does not fall far.

The screens shown in Fig. 1 are supported at eight points in all on a continuous steel runway. Each is driven by a pair of eccentrics mounted on an eccentric shaft on which is placed a flywheel pulley to counteract the action of the shakers. Only two bearings, with a maximum of three, are required to support the shaft operating these screens. The supporting structure is simple and forms an integral part of the steel runway frame supporting the screens themselves and may be either independent of or part of the housing structure.

Hundreds of such equipments in use today are producing coal which, because of its superior preparation, commands the highest price on the market.

Fig. 2 of Mr. Roberts' article shows a Marcus screen fed by a flight conveyor, with the receiving hopper between the conveyor and the screen. The height to the dumping point is not stated.

The heavy pier required to support the driving machinery of the Marcus must not be forgotten. It is fair to suppose that its construction must be of reinforced concrete or other rigid material, in order to withstand the total impact or back action of the Marcus, which can hardly be counterbalanced by any flywheel pulley. The cost of this pier must be many times that of any frame designed to meet the requirements of the standard screens. Furthermore, the driving unit of the Marcus is more or less complicated, consisting as it does of alloyed-steel shafts, cranks, crankpins, connecting-rod, crosshead with guides, pins, braces, etc.

An Eye for an Eye

When we violate some law of Nature we must suffer for it. I do not believe that Nature is any kinder or that she overlooks a violation of her laws in the screening or preparation of coal any more readily than she overlooks a violation in any other science or kindred art. When you eliminate the assistance of gravity and place a screen on the horizontal, some exterior force must be introduced. In the case of the Marcus this exterior force is supplied through the driving head in the shape of excess power, transmitting to the coal a violent motion which, if experiments count for anything, causes considerable degradation.

As a picking table the Marcus is not entirely satisfactory. One must grab and dive for the impurities as they move along over its surface, being constantly on the alert to avoid injury to hands or wrists, owing to the fact that various sizes of coal absorb from the power transmitted to the table different amounts of energy which must be spent. This causes lumps of different weights to travel at different speeds. I cannot see how a man can do effective work in picking from a moving table of this character. He can only spot a piece of refuse the instant that he is ready to pick it from the table and then dive upon it as he would upon a flea.

The picking of egg and lump coal upon the Marcus possibly offers no insurmountable obstacles. The picking of nut, however, is not feasible if this grade is

mixed with the larger sizes. It is becoming more and more essential to pick this grade as the trade becomes more particular. Mr. Roberts does not dwell on this point other than with a passing remark. It can be accomplished only by segregating this size onto another deck placed under the upper decks. This naturally makes it hard to see and awkward to get at and adds considerably more weight, the back action of which must be overcome.

It is no doubt pleasant to the eye to behold a horizontal building, and such a structure perhaps saves more or less covering and framework. But the amount represented by added structural members and the requisite additional covering is negligible in comparison to other costs made necessary by the employment of the horizontal screen.

Another particularly interesting point is the use of an inclined reciprocating chute operated by ordinary eccentrics, as shown in Fig. 3 of the article in question, and labeled "a shaking chute." If it is necessary to use an inclined chute containing a screen after the coal has passed over the Marcus, why use the Marcus? Why not use an inclined screen with the assistance of gravity, if this is necessary in order to finally prepare the coal before it is delivered by the shaking chute to the railway car?

If we are to reason along the lines that Mr. Roberts has set forth, why should it not be advisable to carry the development of the screening apparatus a step farther and make the coal travel uphill? It seems to me that if his argument is logical, uphill would be advisable.

If the loading chute is required for both the egg and the nut tracks, then the comparative cost of installation would not differ materially from that of standard apron loaders, and the wearing parts would be about the same in number.

Power to operate the preparation equipment is of some concern to the coal operator, especially when the central power stations are fast eliminating the individual power plant. It is doubtful if the standard shaking screen requires any more power to operate, if as much, even including the apron loading booms for all three tracks, as does the Marcus, especially if the shaking chutes as illustrated by Mr. Roberts are added for the egg and the nut sizes. We must not forget that in the use of the standard shaking screen gravity helps considerably both in the action of the screen itself and also on the loading booms. This cannot be said for the Marcus, and operators who are in the buying market are carefully looking after these items.

Capacity Is Necessary

In conclusion there is still one point more to mention, probably the most important one, since to the operator it is vital. This is capacity. Let us first consider what the practical width of a picking unit can be in order to allow a man to reach the material as it passes. From actual trial I find it impossible to reach more than 31 in. Now if we place pickers on each side of a unit, it would seem that 60 in. is the maximum width allowable to insure thorough work. Suppose we assume, then, that the widest picking unit is 60 in. in width. How much coal can be passed over such a width to give the operator's daily requirements as stipulated? Most capacities are rated at so many tons in 10, 9 or 8 hr. per day. This means that the tipple designer must provide for double the capacity asked for, since holdups, no cars, etc., must be considered, and it resolves itself into securing the required capacity in much less time than the working day.

Engineers figure that the standard shaking screen 60 in. wide will not satisfactorily handle much over 150 tons per hour of bituminous coal. Assuming, then, that 60 in. would be maximum width to assure thorough picking, it would seem that 150 tons per hour would be the limit of a single screening, transferring or picking medium of any type.

A standard shaking screen equipment, however, is not limited to any width of screen and the lump, egg and nut sizes can be distributed over three apron picking tables, each of 60-in. width, therefore giving three times the available picking ability and naturally a corresponding improvement in coal preparation.

Mr. Roberts states that if capacities are such that the best results cannot be obtained over one Marcus, then two side by side can be employed. This, it seems, would approximately double the size of the building required to house the preparation plant, as well as double the number of wearing parts. This is not the case with the standard shaker equipment.

To sum up, it would appear that the Marcus screen is one way by which coal may be picked and prepared; but until it has proved its superiority in all important features and requirements, it can hardly be called the best way.

Coal Production of Peru

Peru has only just published its mineral statistics for 1914 in the *Boletin del Cuerpo de Ingenieros de Minas del Perú.*

The production of coal in 1914, converted into short tons, is as follows in the various departments into which Peru is divided: Junín, 305,970 tons; Ancachs, 5,510 tons; Cajamarca, 727 tons; Huánuco, 386; Libertad, 221; total, 312,814 tons.

The output of Peru since 1903 has been as follows:

Year	Production, Short Tons	Year	Production, Short Tons
1903	40,686	1909	354,295
1904	66,032	1910	338,667
1905	82,989	1911	357,048
1906	88,126	1912	307,378
1907	204,493	1913	301,887
1908	342,856	1914	312,813

The Cerro de Pasco mines obtain their coal at Goyllarisquizga. It is a coal with much volatile matter and a large percentage of ash. To remove the latter it must be washed, in which process 40 per cent. of the material is rejected. The coal is then converted to coke, the weight of which is about 55 per cent. of the weight of the coal charged into the oven. The best coal from the mine is used on the railroad. The Goyllarisquizga coal costs $2.92 delivered at the surface.

Director Van H. Manning Sums Up the Accident Record for 1915 as follows: The actual number of men killed in the coal industry was the lowest in the last eight years. The death rate for each 1,000 men employed was the lowest in the last 16 years. The number of tons of coal produced for each miner killed was the largest in the entire history of coal mining in the United States. This record will be bettered in 1916. Up to Nov. 1 this year the figures available show a decrease of 105 fatalities, or 6 per cent., as compared with the corresponding period of last year.—Meeting of Coal Mining Institute of America at Pittsburgh, Penn., Dec. 6, 1916.

Power Department

Power Plant at the Brushy Mountain Coal Mine, Petros, Tenn.

By A. W. Evans*

The two buildings comprising the power plant of the Brushy Mountain Mine at Petros, Tenn. (state owned), are constructed principally of stone. The boiler room is 52 ft. wide and 58 ft. long. The equipment consists of four boilers, two of which are of an improved internal-furnace type. Each of these is rated at 150 hp. capacity and is designed for a working pressure of 130 lb.

These boilers are 96 in. in diameter and 16 ft. 8 in. long over all, including a combustion chamber. Each boiler contains one furnace of the Morrison corrugated type, 53 in. in diameter and 12 ft. $9\frac{7}{16}$ in. long. The flues are 120 in number, each 3 in. in diameter and 13 ft. long. These boilers are joined to a stack 34 in. in diameter and 90 ft. high, made of No. 8-gage steel by a breeching built of $\frac{3}{16}$-in. steel.

The other two boilers are of the horizontal return-tubular type, inclosed in brick settings. One of these boilers, which is rated at 150 hp., is 72 in. in diameter and 18 ft. long. The other, rated at 100 hp., is 66 in. in diameter and 16 ft. long. They are connected by suitable breechings to a steel stack 48 in. in diameter and 100 ft. high. This stack is mounted on a concrete foundation placed immediately outside of the boiler room.

Main Details of the Steam Piping

The four boilers are connected to a header pipe 12 in. in diameter. The connection with the boilers is made by 6-in. U-pipes with flanged connections. From this main header steam is conducted in an 8-in. pipe to a 400-hp. Bates Corliss engine, through a 10-in. pipe to a 570-hp. Hamilton Corliss engine, and through an 8-in. pipe to a 260-hp. McEwen high-speed automatic engine.

In the general arrangement of the pipe connections, a plan was adopted in which simplicity is the chief characteristic. The layout is, however, a compromise between absolute simplicity and necessary complexity, due regard being given to the work each boiler has to perform, its availability and its economy in operation.

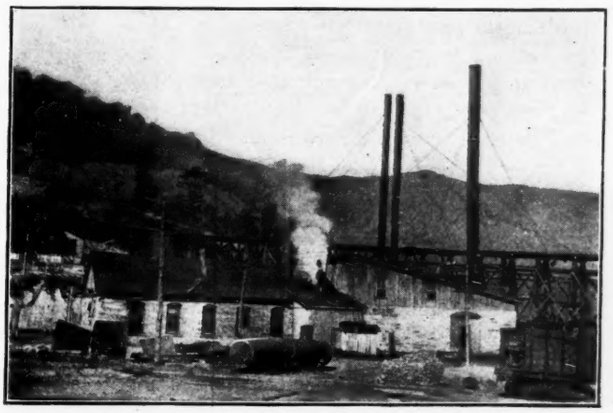
The feed water for the boilers is heated in a closed heater built by the Brownell Co., of Dayton, Ohio. This heater is 48 in. in diameter and 12 ft. high, and has an exhaust inlet 12 in. in diameter. It is connected to a McGowan feed pump. This pump is 12&7x16 in., pumping water through a 3-in. discharge line. Washed coal is used for fuel, and firing is done by hand.

The engine room is 54 ft. wide and 67 ft. long inside. The roof is supported on trusses, and heavy galvanized air ducts are provided for ventilation. Light is furnished by 14 windows, the sash of which are adjustable for ventilation.

The equipment consists of one 400-hp. Bates Corliss engine with a cylinder 24x48 in. The belt wheel on the main shaft consists of two wheels with 24-in. faces 14 ft. in diameter placed close together. This engine transmits power through a three-ply belt 43½ in. wide and 100 ft. long, weighing 900 lb., to a 375-kw. direct-current Allis-Chalmers generator. This generator, which carries the night load, is provided with a belt pulley having a diameter of 52 in. and a 49-in. face.

The day load is taken by a heavy-duty Hamilton Corliss engine direct-connected to a 400-kw. Fort Wayne direct-current generator. The cylinder dimensions are 28x48 in. and the machine was designed for a working pressure of 150 lb. The valve gear is of a patented gravity type, which in operation is smooth, positive and practically noiseless.

Automatic safety stops are provided in case of accident, and provision is made for water-cooling the bearings. The oiling is done by a continuous system from and to one common point. The balance wheel is 18 ft. in diameter, built in halves with a square section of rim 13x13 in. This wheel weighs 45,000 lb. The speed of the engine is 90 r.p.m.



POWER PLANT AT BRUSHY MOUNTAIN

The generator connected to this machine is compound-wound and over-compounded a proper percentage to operate in parallel with a 200-kw. Bullock direct-current generator for 240 volts no load, and 250 volts full load.

Held in reserve is a unit consisting of one 260-hp. McEwen high-speed simple automatic engine, provided with a circulating oiling system. This machine has a cylinder 18x20 in. in dimensions. The belt wheel is 72 in. in diameter with a 21-in. face. Belted to this engine is a Bullock 200-kw. generator, producing 800 amperes with a voltage at no load of 240, and at full load of 250. This machine is connected in parallel to the Fort Wayne 400-kw. generator.

The switchboard consists of five panels made of blue Vermont marble. These are equipped with the necessary instruments and appliances. The busbars are arranged so that the three generator panels may be operated in multiple. The switchboard is 10 ft. in width and 7½ ft. high. It is mounted on a suitable angle-iron frame. The power plant machinery cost approximately $35,000.

*Superintendent, Big Brushy Fuel Co., Petros, Tenn.

Burning the Breeze from Coke Ovens*

SYNOPSIS—Coke breeze is a waste product of the coke oven. It is burned in the ordinary boiler furnace with difficulty and is generally carted away from the ovens at an expense resulting in no returns. This article describes a system for burning this kind of fuel. It consists of an overfeed stoker, special grates and a steam-jet or a blower-type of forced draft. Coke breeze containing between 25 and 35 per cent. ash will evaporate about 6 lb. of water per pound of dry fuel.

Coke breeze is to the coke industry what the culm pile is to the coal mine. Each represents a fuel that at one time had no value, although containing sufficient heat units to warrant burning, if means could be found to burn it. The solution of the culm pile has been found in the washery; that of coke breeze in a mechanical stoker.

Attempts which have resulted in varying degrees of success have frequently been made to burn bee-hive oven coke breeze under hand-fired conditions. One of the difficulties has been to keep firemen because of the arduous labor. During the summer months there is the extreme heat to which the men are exposed both from the natural temperature of the boiler room and from the radiant heat from the furnace when firing or cleaning the fires is in progress. There is also the additional weight of fuel to be handled necessary to develop the required rating of the boilers, thus increasing the labor of the firemen over that required if a fair grade of coal were being used. Owing to the many difficulties encountered, hand-fired coke breeze with the ordinary grate and design of furnace is not successful. About 1896 a series of experiments in burning this fuel under return-tubular boilers were carried on by Charles N. Hays in connection with Robert Ramsey, Sr., superintendent, and later with O. W. Kennedy, general superintendent, and Mr. Parker, chief mechanical engineer, of the Frick Coke Co., Mt. Pleasant, Penn. At the initial stage of these experiments no special furnaces were used and a fixed distance between the grates and the boiler was maintained.

It was soon found that the fuel required a forced draft to furnish the necessary air supply, and the steam-jet type was used. A special pattern of shaking and dumping grate was also designed. Before the proper ratio of grate to boiler-heating surface to give the best results was determined, a number of changes were necessary and the proportion of air space in the grates was changed several times; the air pressure in the ashpit was also altered. Whenever a change or combination of changes was made, tests were conducted until a standard of grate surface, air space and blower capacity for different types and sizes of boilers was decided upon.

*From "Power."

There are two kinds of coke breeze—one from beehive, the other from byproduct coke ovens. It is impossible to handle the fuel in other than a quiescent or an unagitated state. The use of stokers that agitated the fuel resulted in the formation of a mass of clinkers sufficient to compel the shutting down of the plant after a few hours' run, while the fires were being cleaned. Operating under such conditions would make the cost of maintenance practically prohibitive and the labor cost would be about one-third greater than when hand-firing.

The average coke breeze produced contains from 25 to 35 per cent. of sand, sulphur and fireclay, all of which go to make up a considerable clinker formation. The necessity of handling these materials is what led to the development of an overfeed stoking system that distributes the fuel evenly over the grate surface from above the top of the fire bed. The principle of the stoker system is that the fuel flows through the hopper (see Fig. 1) by gravity onto a pusher plate, from where it is precipitated into an impelling chamber by the pusher that is operated by a rocking arm in contact with a cam, or from an eccentric attached to the rocking arm. The impellers distribute the fuel over the fuel bed in any required amount up to that necessary to operate the boiler greatly in excess of its normal rating. Fig. 3 shows a front view of the stoker.

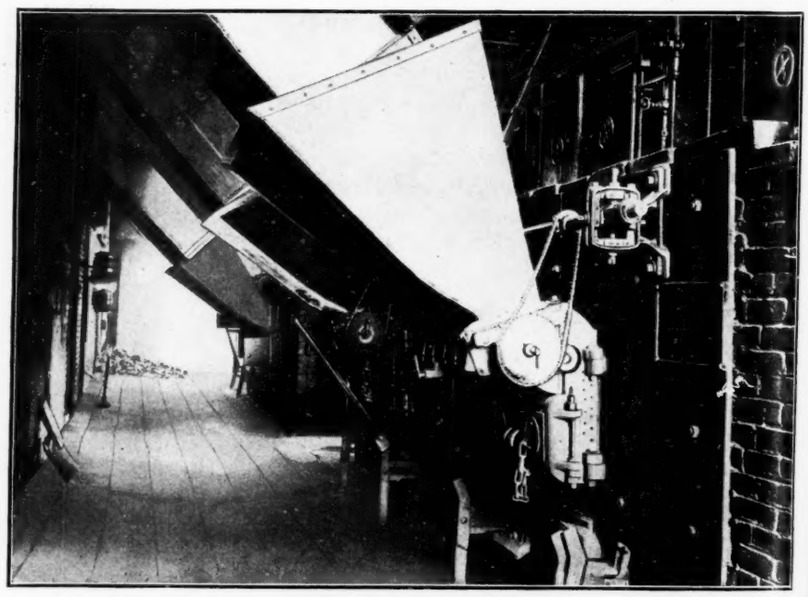


FIG. 1. STOKERS HANDLING COKE BREEZE

To handle the clinkers produced in burning coke-breeze fuel, a specially designed rocking, cutting and dumping grate is used (Fig. 2). The fuel bed is carried about 8 in. thick at the front of the furnace, and as the grates are pitched, a depth of 18 in. is carried at the bridge-wall. At intervals the grates are operated for shaking; that is, the points of the grates are dropped about 3 in., and as the clearance space between the bars remains the same, nothing but fine ashes is sifted to the ashpit. The shaking movement is so slight that the fire bed is not disturbed to any great extent. This movement also prevents the amalgamation of clinker-forming impurities

The fuel bed as carried by this system[1] is divided into three zones (Fig. 4). The first is about 5 in. thick at the front to 15 in. at the back. This residue formation diffuses the air over the grate area and prevents blowholes in the fire that would be caused by an unequal air pressure. The second fuel zone is carried about 3 in. thick all over the grate surface and is composed of the incandescent particles of carbon in the fuel. The third zone is the green fuel that is continually sprinkled over the second zone. The moisture in the fuel is evaporated by the heat from below and also by the heat reflected

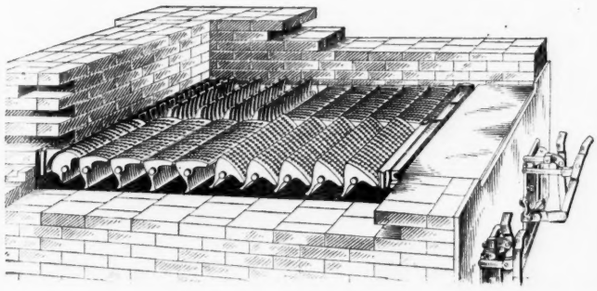


FIG. 2. DUMPING, SHAKING AND RUNNING POSITION OF THE GRATES

from the arch above. During the process of combustion the impurities are separated from the combustible and work their way through the layer of residue forming the first zone, where they come in contact with the cold air and are chilled before they become fused in large quantities with one another.

With this kind of fuel it is necessary to operate the cutoff movement of the grates about every two hours, which removes about 1 in. from the bottom of the residue

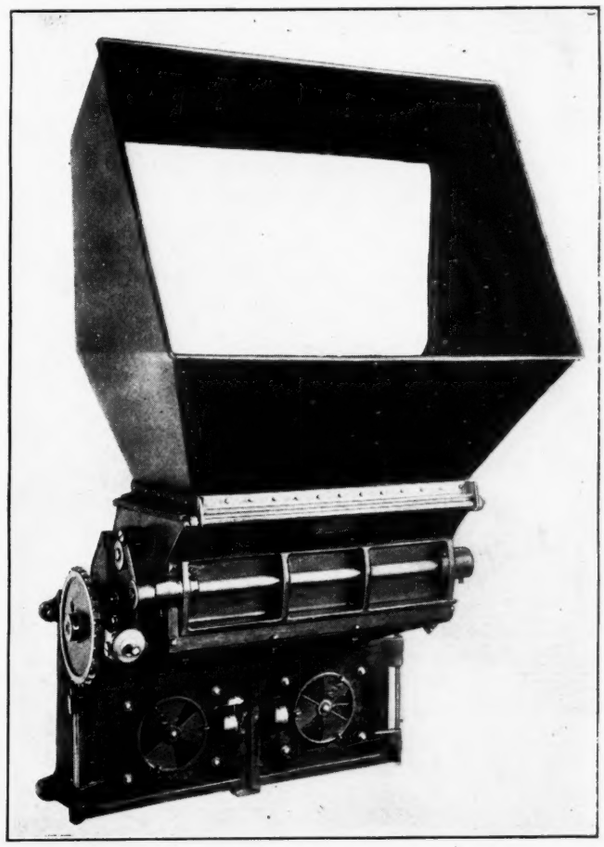


FIG. 3. FRONT VIEW OF STOKER

at each stroke. In this way the fires are cleaned without disturbing the fuel bed and without the use of fire tools. The grates used have a 40 per cent. air space, and sufficient steam is used under them to insure the chemical decomposition of the clinker-forming properties.

[1]Charles N. Hays Co., Pittsburgh, Penn.

TESTS OF 80-HP. FIRE-TUBE BOILER AND COKE-BREEZE FUEL

1	Date	Aug. 11, 1910	Aug. 22, 1910	Aug. 23, 1910	Aug. 31, 1910	Sept. 1, 1910
2	Duration of trial, hr	8	8	8	8	8
3	Grate area	27	27	27	27	27
4	Water-heating surface	960	960	960	960	960
5	Kind of fuel	48 hr. hand drawn	72 hr. mach. drawn	72 hr. mach. drawn	72 hr. mach. drawn	72 hr. hand draw
6	Steam pressure	74.5	83	81.8	86.4	88.2
7	Temperature of steam	319.4	325.89	325	328.36	329.64
8	Temperature of feed water	72.0	68	74	72	71
9	Total amount of fuel consumed as fired	5,275	5,950	7,000	5,958	6,217
10	Moisture in fuel, per cent	3.51	3.14	3.05	5.24	7.03
11	Dry fuel consumed	5,089.85	5,763.17	6,786.5	5,645.8	5,779.94
12	Total ash	1,756	1,269	1,886	1,850	1,768
13	Per cent. of ash	34.50	22.02	27.79	32.76	30.59
14	Total combustible	3,333.85	4,494.17	4,900.5	3,795.8	4,011.94
15	Dry fuel per hour	636.23	720.39	848.31	705.725	722.49
16	Combustible per hour	416.73	561.65	612.56	474.475	501.49
17	Moisture in steam, per cent	0.75	0.6	0.7	0.6	0.75
18	Total water apparently evaporated at working press.	24,708	30,049.5	34,080	28,900	30,181
19	Total water actually evaporated at working press.	24,502.69	29,869.2	33,841.44	28,726.6	29,954.64
20	Factor of evaporation	1.180	1.186	1.1803	1.182	1.184
21	Equivalent water evaporated from and at 212 deg. F.	28,913.17	35,424.87	39,942.5	33,826.84	35,394.29
22	Equivalent water evaporated from and at 212 deg. F. per hour	3,614.15	4,428.11	4,992.81	4,228.355	4,424.286
23	Water actually evaporated per lb. dry fuel at working press.	4.81	5.18	4.98	5.08	5.18
24	Equivalent water evaporated per lb. dry fuel from and at 212 deg. F.	5.68	6.14	5.88	5.99	6.12
25	Equivalent water evaporated per lb. combustible from and at 212 deg. F.	8.61	7.88	8.15	8.91	8.82
26	Dry fuel burned per sq.ft. grate surface per hr.	23.56	26.68	31.42	26.138	26.75
27	Dry fuel burned per hp. per hr.	6.07	5.61	5.86	5.75	5.63
28	Water evaporated per sq.ft. heating surface per hr. from and at 212 deg. F.	3.76	4.61	5.2	4.40	4.608
29	Commercial hp. developed	104.76	128.35	144.72	122.56	128.23
30	Commercial hp. rating of boiler	80	80	80	80	80
31	Per cent. of rated hp. developed	130.95	160.45	180.9	153.174	160.3
32	Efficiency of boiler and furnace, per cent	49.7	52.74	53.73	56.04	55.21
33	Calorimeter temperature	267	274	271	275	273
34	Stack temperature	485	540	537	561	532
35	Steam for blowers, per cent	12.5	8.11	7.46	8.05	7.4
Proximate fuel analysis	Carbon	58.66	67.37	59.12	62.13	61.03
	Moisture	3.51	3.14	3.05	5.24	7.03
	Volatile	12.58	6.73	8.69	6.07	8.62
	Ash	28.76	25.90	32.19	31.80	30.35
	Sulphur	0.83	1.085	1.140	1.025	0.759
	B.t.u.	11,017	11,241	10,568	10,323	10,704
		Original blower		—Improved type larger capacity blower—		

Byproduct coke-oven breeze does not contain the same nature or quantity of clinker-forming properties as beehive-oven breeze, and a two-stage turbo-blower is used because it has a greater efficiency than the steam blower. Also it is not necessary to saturate the air with steam to the same extent as with beehive breeze.

The accompanying table is a record of tests made on an 80-hp. fire-tube boiler, the furnace of which was equipped with an overfeed stoker.

The water evaporated per pound of combustible from and at 212 deg. F. for the tests averaged 5.96 lb. This evaporation may seem low, but it is from a fuel that has had no market value, and in fact has had to be hauled away at an expense for which there has been no return.

The efficiency of the boiler and furnace averaged 53.48 per cent. for the tests, which is low as compared with what would be expected when burning a better grade of fuel. However, several items that are not apparent on the surface enter into the results obtained. The ash content of the fuel is high, there was no arch over the fires, and the direct contact of the gases with the cold boiler

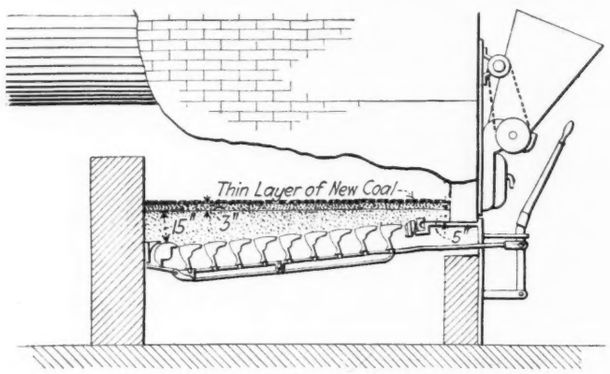


FIG. 4. A DEEP BED OF ASHES IS CARRIED

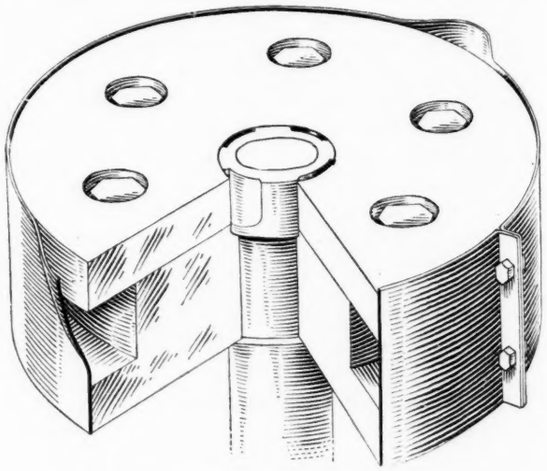
shell and the limited area for the expansion of the gases all naturally affected the combined efficiency and increased the cost of a unit quantity of steam.

The boiler plant shown in Fig. 1 contains four 80-hp. return-tubular boilers, all equipped with the overfeed type of stoker and system for burning coke breeze. The plant supplies steam for the mine pumps of the Oliver & Snyder Steel Co., near Uniontown, Penn.

The intensity of the fires is governed by the speed at which the stokers are run and the force of the steam jet at the blower. The fuel gives an intense heat, and no trouble is experienced in burning it.

Emergency Piston Packing Ring*

The combined air and circulating pump of one of our condensers was "operating on one leg." A clicking noise came from the steam cylinder (a peak load comes on the plant at 6 p.m.), and it was at noon that we decided to investigate, thinking that it was only a loose follower or broken spring, easily remedied. But when we opened the cylinder, the ring was found broken into four pieces, and we had no spare on hand. I decided to make a ring out of babbitt metal. The piston and its follower were removed from the cylinder and, after cleaning, were re-assembled. A strip of tin was formed into a band to fit over the outside with two lips on the top edge of the band, as shown in the illustration. Old metallic packing and babbitt metal mixed were melted and poured into the piston inside of the tin band. After it was cold, the tin band was cut off, the follower removed and



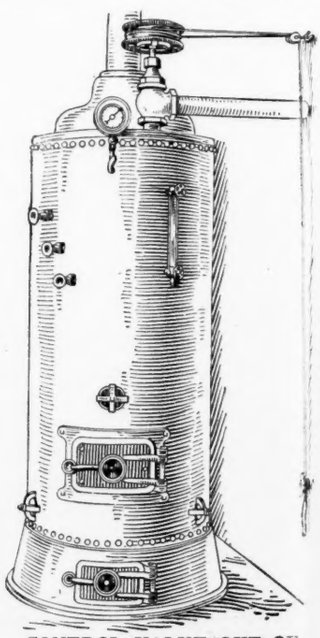
SPACE POURED FULL OF METAL

the babbitt ring dressed up with a file and scraper. A little peening with a hammer made it a fairly good fit in the cylinder, and since 40 lb. of steam is about all the pressure used in this cylinder, its temperature is far below the melting point of babbitt metal. We completed the repair in four hours, and the ring is still doing duty.

*H. C. Williams, of Concord, N. H., in "Power."

Operating "Out-of-Reach" Valves*

The illustration shows a home-made device for operating a valve that happens to be out of handy reach. An angle valve is mounted on the top of the boiler, as shown, and as the roof of the boiler room gives only a few inches of clearance above the valve, it is inconvenient to reach the hand-wheel. A wooden drum was turned to a diameter considerably greater than that of the valve wheel, with a recess in the center for the nut on the valve stem, so the drum sets on the rim of the wheel. Four iron clamps were bent, two to fit over the rim and two over the spokes of the wheel. These were held by large wood screws. A cord was wrapped twice around the drum and then carried through a pair of small pulleys fastened to the wall, level with the drum, and made fast to a cleat. It is necessary to keep the cord taut while working the valve, in order to get a grip on the drum and to keep it from running off.



CONTROL VALVE OUT OF EASY REACH

*Hugh C. Boutell, of Philadelphia, Penn., in "Power."

Tipple and Mining Methods at Hisylvania Mine No. 22

By Wilbur G. Burroughs*

SYNOPSIS—The unusual feature of this plant is the tipple construction. This building has a frame of 2-in. pipe encased in brick and concrete. Girders and floors are of reinforced concrete and the sides proper of steel. The mine is a slope operation worked on the panel system, and the output is carefully prepared for market.

A remarkable tipple, probably the first of its kind in the United States, was invented and built in 1913 by J. W. Blower, president of the Hisylvania Coal Co., at No. 22 mine in the Sunday Creek district of the Hocking Valley coal field, Glouster, Athens County, Ohio. The tipple is of brick and cost approximately 50 per cent. less than a similarly planned tipple of steel. It stands on the east side of Sunday Creek at the foot of the hills, which rise 300 to 400 ft. on both sides of the valley. Formerly there had been a swamp here, but this was filled in with material from the hill adjacent.

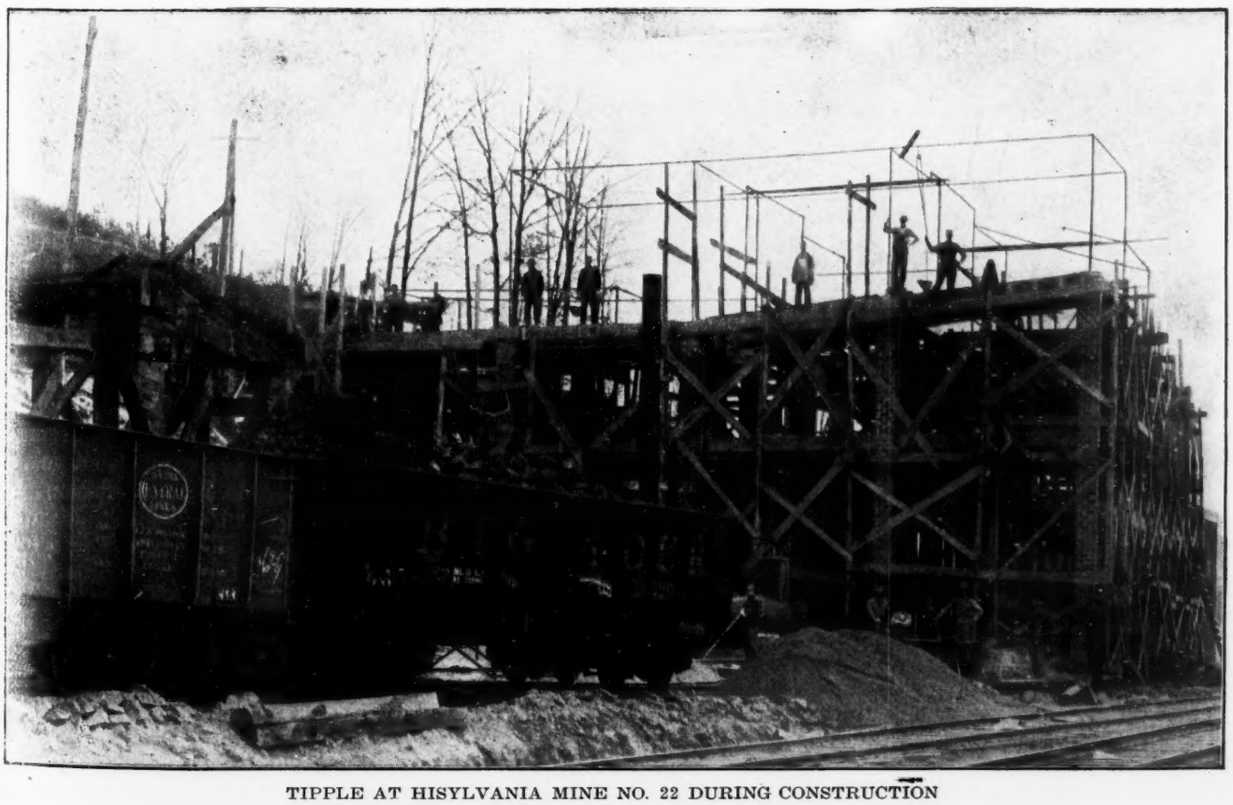
The foundations of the brick tipple were sunk through the made ground and mantle rock beneath until solid rock was reached at a depth of 9 to 12 ft. Next the framework of the tipple was erected of 2-in. steel pipe as shown in the accompanying illustration. Around the vertical steel pipe were built hollow brick pillars 19 in. square. As these pillars rose higher and higher, the open space left within, between the brick sides and the pipe, was filled with concrete. Girders and floors were built of reinforced concrete and the sides proper are sheathed with sheet steel.

Beside the tipple was erected a power house in which are installed three 350-hp. boilers, one Westinghouse automatic compound engine, one Westinghouse 225-kw. generator and one 100-kw. generator; also one 150-hp. engine made by the Monongahela Engine Co., for operating an endless-rope system by which the mine cars are brought up the slope to the tipple.

Just behind the tipple is the entrance of the slope to the mine. The coal worked is known by several names—Middle Kittanning, Hocking Valley, or No. 6 coal seam. This No. 6 coal, states J. A. Bownocker, state geologist of Ohio, in Bulletin No. 9 of the Geological Survey of that state, "has always been considered the most valuable seam in Ohio. It extends entirely across the state from Columbiana County to Lawrence County and is mined in a large or small way from the Pennsylvania line to the Ohio River. It is the most persistent seam in the state, though of course it varies in thickness from place to place."

At the Hisylvania Mine No. 22, the No. 6 coal bed is 12 ft. thick, but the 5½ ft. of coal at the top of the seam is somewhat poorer in quality and is left for roof in entries and rooms, the better grade of coal below being mined. This coal is of excellent quality, black, glossy and well suited to the domestic purposes for which it is sold.

*New Rochelle, N. Y.



TIPPLE AT HISYLVANIA MINE NO. 22 DURING CONSTRUCTION

Above the coal comes 6 to 10 ft. of slate, then massive, gray rather coarse-grained sandstone, giving an excellent cover of 135 ft. for the mine workings. Beneath the coal seam is a layer of fireclay about 8 in. thick underlaid by sandstone and limestone interbedded. This gives such a firm foundation that there is but slight chance for the floors of the entries and rooms to heave. The formation in which the No. 6 coal occurs dips southeast 24 ft. to the mile.

When mined, the coal is brought to the tipple up the main-haulage slope, which is 620 ft. long from its mouth to the point where it reaches the coal bed and has a grade of 27 per cent. It is 16 ft. wide by 9 ft. high; lined with brick for 150 ft. inward from the portal, throughout which distance it passes through shale, after which the massive sandstone is reached. Two tracks extend 850 ft. from the entrance. Here the double track ceases and a single track continues farther into the mine, running in the center of the entry. A refuge hole is cut every 60 ft. in the ribs of the slope for any one who may be in the slope when trips are running. The miners, however, are not supposed to use this passage in entering and leaving the mine, the air slope which is 16 ft. wide and 8 ft. high, brick lined, with a 35 per cent. pitch, being used for this purpose.

Some Gas Is Found

A little marsh gas is encountered in this mine, but with thorough ventilation the danger is slight. No uneasiness is felt as to spontaneous combustion of coal dust as the mine is wet, the coal and coal dust never being dry. This is owing to the coarse, porous nature of the sandstone formation overlying the coal, and through which for some distance the main haulage slope extends. The ground water readily seeps from this porous medium. The mine pumps are kept going constantly, discharging water from the workings. At the bottom of the slope is the sump, 33x16 ft. in area and 6 ft. deep.

The method of mining employed is the panel system, based on the room-and-pillar method. Face and butt entries are driven on the face and butt cleats of the coal. The double entries are 12 ft. wide and 6 ft. high. Coal pillars 30 ft. wide are left between entries. Breakthroughs are made every 60 ft. Each pair of face entries is 1300 ft. from the next parallel pair. A barrier pillar 100 ft. thick is left along the face entries, to protect the haulageways against any trouble that might arise in the room entries.

After the haulageway is no longer of especial importance, this barrier pillar of coal is mined by either face or butt rooms. Butt entries are turned every 600 ft. from the face entries. Rooms are turned from the butt entries, the room necks being 12 ft. wide and 25 ft. long, after which the neck is widened to room width. The length of the room is 300 ft. Breakthroughs, staggered, are driven every 60 ft. The rooms alternate in having a single and double track. A single-track room, widening on both sides of the neck, is 26 ft. wide, the track being in the center of the room. A double-track room, widening from one side of the neck only, is 30 ft. wide, a single track being laid on each side of the room.

The purpose of these single- and double-track rooms is as follows: In the single-track room the gob is placed on either side of the track, as the room is driven forward. When the rooms are 300 ft. long, which is one-half way to the opposite butt entries, the pillars of coal are drawn. The gob is then in the way if the pillars are to be drawn from the single-track rooms. In the double-track rooms the gob is placed between the tracks in the center of the room. When the pillars are to be drawn, there is therefore no waste material or other obstruction whatsoever between the pillar of coal and the miner. The pillars in the double-track rooms can therefore be extracted without unnecessary labor.

In special localities, where the roof is liable to break due to pressure from the overlying rock formation, the rooms are narrowed to 20 ft.

The plan of mining is to drive the rooms from the north side of the entries. As soon as these rooms are finished halfway to the next parallel pair of entries, the pillars between the rooms are drawn to entry stumps. During this time the rooms to the south of the double entries will have been necked only. When the north-room pillars have been drawn to stumps, the south rooms will be worked, beginning at the far end of the entry. As soon as the rooms are completed, room and entry pillars will be taken out simultaneously. All pillar work is kept on a 45-deg. line.

The advantages of the method described above are that it does away with any creep that might occur, since there is a solid body of coal left between the areas being worked; and that when that portion of the coal seam being mined is worked out, it will settle so that mining the solid body of coal at first left intact will be easily accomplished without it being affected by the areas already mined.

Electric Undercutting Is Practical

Electric mining machines are used in undercutting the coal and except on the slope, where an endless rope is employed, the haulage in the mine is by electric mine locomotives. At the slope each loaded mine car is gripped to the part of the rope which is moving up the slope to the tipple. To insure against accident in case a car broke loose and started backward down the slope, safety dogs have been installed in the center of the track, short distances apart. These consist of two arms, one of iron the other of wood, fastened together, the point of meeting acting as a fulcrum. This is attached securely to the bottom of the slope midway between the rails of the track. The iron arm lies flat on the slope floor, the wooden arm rising just enough so that mine cars passing up the slope will strike and depress it slightly as the car moves over it. As soon as the pressure from the car is released, the iron arm brings the wooden one back to its original position. Now if any car should move backward down the track, the wooden arm would be raised high enough to come in contact with the car and stop it before it had gained sufficient momentum to throw it from the track.

On reaching the tipple platform the loaded cars are detached from the rope and run onto a Jeffrey crossover dump. After the coal is discharged, the cars move forward to the kick-back, whence they run backward by gravity to the empty-car track where they are gripped to that portion of the endless rope passing down the slope into the mine.

The coal on being dumped is first passed over shaker screens made by the Morrow Manufacturing Co. The lump coal then passes onto a picking table which terminates in an adjustable loading boom. This delivers the coal to railroad cars on the tracks beneath the tipple.

The combined picking table and loading boom was made by the Jeffrey Manufacturing Co. The portion used for picking is 4 ft. wide and 20 ft. long; the boom is 28 ft. in length, making the total length of the combined machine 48 ft. It is capable of handling 120 tons of run-of-mine coal per hour at a speed of 40 ft. per min. The boom is raised or lowered by an electric hoist. The coal is deposited gently in the railroad cars and is thus shipped clean and with little or no breakage.

The nut coal is cleaned by passing over a stepped shaker screen, from which it goes directly into the railroad cars. All coal in railroad cars is weighed on a Fairbanks railroad scale.

Mr. Blower, president of the Hisylvania Co., told me that the brick tipple has stood the test of time and usage in an entirely satisfactory manner, there being no vibration and all parts standing up as firm and rigid as tipples constructed of steel or concrete.

For information and aid in securing material for this article both in Columbus and at the Hisylvania Mine, Glouster, Ohio, I am indebted to J. W. Blower, president, and to E. M. Blower, director, of the Hisylvania Coal Co.

Recollections of a Mine Manager

Since each employee at our mines paid his pro rata share of his camp physician's salary, we had assumed for years that the camp physician must be chosen by popular ballot. As a matter of fact, we realized that many of the physicians at our camps were not so competent as they might be. The same thing, however, might be said of officials of whatsoever rank or condition elected by popular ballot in any democratic community; it is a weakness inherent in the system as it were, and at that it is a weakness that must not be discussed in public, especially by members of the so-called ruling class.

After I had held down the manager's job for a while, I began to question the wisdom of tolerating incompetent physicians just because our men offered no objection to them. Occasionally we had an accident at one of the mines and, because the camp physician lacked the necessary skill, the injured man became a cripple for life; whereas, if proper attention had been immediately available, the injury would not have been permanent. Then contagious diseases were sometimes allowed to get a foothold in some of the camps before the camp's physician realized the threatened danger and took the proper steps to protect the inhabitants.

I discussed the problem with our union officials and they told me point blank that as long as their members footed the bill with a "checkoff" no change in the method of appointment would be considered.

I discussed the question with our company attorney and he held up his hands in horror. "Mr. Thompson, we have little enough standing in court as it is," he remarked. "Please don't let an impression get out that we would willingly influence the men in their elections for physicians."

Finally matters became so desperate at one of the camps that I decided to take the bull by the horns and do a little experimenting without the assistance or consent of either the union officials or our apprehensive legal department.

At the particular camp chosen for the experiment the monthly collections for the physician were in reality so small that a proficient doctor had never been attracted by them. For that reason the electors were not entirely to blame for the unhappy state of affairs, and in consequence my proposal did not meet with much opposition. The regularly appointed physician's time had expired, and I announced to the citizens through the superintendent that we had decided to appoint a competent physician and place him on the company pay roll; any employee of the company might employ this man as his family physician at the same rate that had been in effect previously, but the service was not to be compulsory.

At first only about 10 per cent. of the men asked to be placed on the doctor's list, but he had no idle moments at that; he started out to rid the camp of flies and mosquitoes and otherwise put things in order.

Although the men were not compelled to employ the company physician, they were required to follow any orders that he saw fit to issue for the general welfare of the camp. In a short time the wives in that camp began to comment on the change that had come over the camp as a whole, and then individual wives who had required the services of the doctor in their homes began to spread his fame beyond the limits of the camp.

It was not long before a neighboring camp requested that the new doctor be allowed to pay them a visit to give them suggestions. We promptly offered to send them a permanent physician on the same terms and they accepted.

So much for the beginning; in less than two years we succeeded in ridding our camps of all quacks.

COMING MEETINGS

Northwest Mining Association will hold a convention at Spokane, Wash., Feb. 19-25, 1917.

American Institute of Electrical Engineers wil hold its midwinter convention in New York City, Feb. 7-9. Secretary, F. J. Hutchinson, 33 West 39th St., New York City.

American Institute of Mining Engineers will hold a meeting Feb. 19-22, at 29 West 39th St., New York City. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

Tenth Chicago Cement Show at Coliseum, Feb. 7 to 15, 1917. Secretary, B. F. Smith, 210 So. La Salle St., Chicago, Ill.

The American Concrete Institute will hold its annual meeting at the Hotel La Salle, Chicago, Ill., Feb. 8-10, 1917. Secretary, Harold D. Hynds, 1418 Walnut St., Philadelphia, Penn.

The St. Louis Coal Club will hold its third annual banquet and entertainment Jan. 31, 1917, at the American Hotel Annex, St. Louis, Mo. H. L. Laird, secretary of the Northwestern Traffic and Service Bureau, will deliver an address on "Trade Organization."

Engineers' Society of Western Pennsylvania, Metallurgical and Mining Section, will hold its annual meeting Jan. 30, 1917 in the rooms of the society, Oliver Building, Pittsburgh, Penn. "The Possibilities of Smokeless Operation of Heating Furnaces and Soaking Pits" will be the subject of the meeting. Secretary, Elmer K. Hiles, Pittsburgh, Penn.

American Society of Mechanical Engineers, Philadelphia Section, in conjunction with the Franklin Institute, will hold a meeting in Philadelphia on Feb. 1, 1917, at which a paper on "Byproduct Coke and Coking Operations" will be read by C. J. Ramsburg, vice-president of the H. Koppers Co., of Pittsburgh, Penn. The paper will be illustrated by lantern slides and a moving-picture film showing the operation of a by-product-coke plant.

Moral Responsibility for Peak Loads in Coal Mining—In ordinary years several millions of domestic consumers, who could easily and cheaply secure their autumn coal supply during the summer months, refuse to do so and throw the peak load of their requirements on October and November. Fortunately, the industrial consumers are not so completely improvident.—Glenn W. Traer at American Mining Congress.

The Labor Situation

General Labor Review

In the anthracite region all the interest centers around the decision of the umpire of the Conciliation Board that contract machine mining violates the agreement. It practically makes it impossible to profitably introduce machines into the anthracite mines.

In central Pennsylvania the miners demand more urgently than ever that the coal companies accept the miner's coal at the working face. The miner insists that his duty ends with loading and does not in any way embrace the work of transportation of either empty or loaded cars. The mine workers, through John Brophy, their newly elected president, do not demand immediate action, but they desire a start to be made and some evidence given of a determination to reduce the practice of car pushing.

How the desired practice can be introduced by degrees without discrimination it is somewhat hard to see; but possibly the miners merely want at this time to be afforded the assurance that contracts for the supply of machinery have been let and expect that underground the operators will provide the necessary headroom for mules or motors in all new rooms and entries.

Can a Firm Leave Operators' Association?

The final hearing of the Moshannon Coal Mining Co., on the charge that it has violated its contract with the Association of Bituminous Coal Operators of Pennsylvania, will be held on Jan. 31. This company increased its mining rates 33⅓ per cent., though when it associated itself with the mine operators' organization it bound itself, or rather is alleged to have obligated itself, to follow the wage decisions of the operators with whom it confederated.

Meantime the mine workers are not overwell satisfied with the size of the bonus, though under their contract they were entitled to none at all. The miners of the Logan Coal Co. and of the Beaver Run Coal Co. at Beaverdale recently struck and were practically all idle during the last week. They wanted an increase in wage, the bonus not satisfying them. The men are union men and are therefore not justified in striking. They were already getting what amounted to 10 per cent. more than the union wage.

However, on Tuesday, Jan. 23, the miners returned to work, the companies only granting what were quite reasonable demands for the abolition of the standard weight for cars which had been set at 3000 lb. If a loaded car weighed less than that amount, the miner received pay for just as much as the coal weighed; but if the weight exceeded 3000 lb., the standard weight, the miner received no pay for the excess.

Thus if the car weighed 3500 lb., the miner received credit for only 3000. In granting the demands of the miners, it is agreed that the companies will levy a fine on the miners if the cars are overloaded. The miners are also pledged not to go on strike in the future until they have presented their claims to the grievance committee. Pending an adjustment of difficulties, the miners will continue at work.

The Pennsylvania Coal and Coke Corporation has 200 men idle at Bens Creek. They want a bonus of 50c. on yardage work. The corporation granted the increase some time ago, but when it gave the 10 per cent. bonus it revoked the preceding concession.

Conditions are unaltered in Somerset County. The union is discouraging the starting of strikes in the cold weather, but is endeavoring to plant union men in the nonunion mines throughout the county, relying on them for a union campaign in the spring.

At Jerome the men of the United Coal Corporation who were demanding increased pay have withdrawn their demands and gone back to work. At Garrett, in the same county, about 300 miners have resumed work on being promised an increase of 15 per cent. on their earnings, dated from Jan. 1, 1917.

In the Pittsburgh district the effort of some of the union miners to get fifty locals to petition for a special convention to demand an increase in the scale over that provided in the contract seems to have failed, only ten locals seeming at this time to favor such a movement. It is understood that the matter has been dropped for the present, but will be revived again about Apr. 1.

Another movement has been started, however, by one or two locals which are discussing the advisability of withdrawing from the United Mine Workers of America, and demanding or requesting of their individual employers increases in mining and day wages. This movement is, of course, meeting with opposition from the district officers of the organization. No definite action has yet been taken.

The operators in the New River field have consented to give an increase to the mine workers as the result of a meeting with the miners at the National City Bank, Charleston, W. Va., on Jan. 16. This increase will begin Mar. 1, 1917, and is granted because of the increased cost of living. In the Loup Creek and New River fields an increase of 5c. per ton will be granted for pick mining and machine-coal loading. In the Winding Gulf district the increase will be 12 per cent. on the same items. A 10 per cent. increase will be given on the existing basic minimum day-wage scale for day labor in all three fields.

Anticipate Bonus in the Interstate Field

However, the operators in their agreement relieve themselves of any moral obligation to meet raises in the Central Competitive District of western Pennsylvania, Ohio, Indiana and Illinois, except in such amounts as shall exceed these advances now given. So far the Central Competitive District has given no advance, but it is quite confidently anticipated.

The operators also declare that the new agreement does not in any way invalidate the force of the provisions of the contract made Apr. 1, but merely supplements them.

The new scale is a contract scale. It runs, however, till further notice. It is signed, unlike the new central Pennsylvania understanding, by both the operators' and the miners' committees.

In Thurber, Tex., the mines have resumed operation after a strike lasting one month. The mine workers were granted an increase of 5c. a ton on coal mined and 5 per cent. on daywork and deadwork. The mines are now being operated on full time and even then are unable to meet the demand for coal especially since the wintry weather has set in.

In District 21 a revote for most of the offices will be necessary, as most of the candidates failed to receive the required majority of the votes cast. John Wilkerson, of Thurber, Tex., is elected, as he ran unopposed. He received 5375½ votes. Three conference committeemen also received a majority of the vote cast and were elected. They are James Hughes, of Lehigh, Okla., representing the Atoka tract; J. D. Winters, of Monte Ne, Benton County, Arkansas, representing the semianthracite mine workers of Johnson, Pope and Logan Counties, Arkansas; Edward Bishop, of McCurtain, Okla., representing that part of the Oklahoma coal field adjoining the Arkansas coal region, including Bates, Ark.

But the other officers were not so fortunate and the two nominees for each office who polled the largest vote will have to stand for election again. Thus the second election will have to be held to fill the posts of vice-president, secretary-treasurer, international board member, four subdistrict board members and three conference committeemen. These committeemen will represent the following districts: (1) That part of Oklahoma paying 78c. a ton for mining coal; (2) Sebastian County, Arkansas, and (3) the bituminous fields of Franklin and Johnson Counties, Arkansas.

Canadian Miners Still Want Second Bonus

In Canada no settlement appears to have been made and Government ownership looks possible, or at least Government management during the continuance of the war.

The operators contend (1) that wages have increased faster than the cost of living; (2) that rent, fuel and light have been supplied at an unchanged price to the mine workers; (3) that any computation of the increase in the cost of living between July and November takes no account of the natural increase between the summer and late autumn; (4) that increased wages involve increased production cost; (5) that this increased cost might close down several mines; (6) that in competitive mining districts there is no record of working conditions being violated with higher cost of living as a pretext; (7) that 80 per cent. of the men disapprove of the demands and (8) that the demand violates an agreement with the union.

Apparently Mr. Harrison, of the labor department, has ascertained that prices have gone up 9½ per cent. on such articles as are required by the miners in their daily needs. The operators claim that the demand was made by the mine workers when the cost of living was lower than when the contract was made in 1915 and that its presentation was the outcome of the shortage of men resulting from the war and not from the economic necessities of those continuing at work.

At an earlier date the operators granted under pressure an increase of 5 per cent. to last under Mar. 31, 1917, agreeing to pay a further increase of 2½ per cent. from that date till the end of the war. The district board accepted this, but the union mine workers refused to accept it and demanded 10 per cent. As a result of further negotiations a war bonus of 5 to 12½ per cent., terminating Mar. 31, 1917, was proposed and agreed to by the union members. The settlement was of short duration. The election took place and the newly elected board disregarded the agreements and asked for a 25 per cent. war bonus, a demand the operators rightly regard as unreasonable and unwarranted.

Secret Contract on Car Pushing

There seems to be some truth in the persistent reports that regardless of the sanctity of their agreement and despite the fact that no new condition has arisen to make the demand for a new arrangement reasonable the mine workers of central Pennsylvania intend to demand the abolition of car pushing.

John Brophy, the president-elect, has issued a statement in which he strongly intimates that he expects developments favoring the elimination of car pushing even before the first of next April, at which time he assumes office. If the issue is not settled in favor of the miners by that time he expects to start a campaign to that end.

He says that the miners of district No. 2 would never have voted for the 1916 scale had they not been assured by the operators that car pushing would be abandoned. According to Mr. Brophy, there was no specific agreement in the contract because the operators wished to keep the pledge secret, fearing that the manufacturers, knowing the predicament of the operators, would promptly use the opportunity as a lever for increasing the price of gathering machinery, the cost of which would, at best, run up into hundreds of thousands of dollars.

Conciliation Board Makes Important Machine-Mining Decision

The Anthracite Conciliation Board has made an important decision relative to machine mining. But it does not appear that it will serve the interests of anyone—the public, the miners or the operators. We are always hearing it stated that the operator must produce his product at a uniform rate regardless of wage increases. His output, we are told, should be obtained at an unchanged cost, despite increasing wages, by means of increased efficiency. The public has some reason in its demand, but there can be no hope of realization until the miners withdraw their opposition to labor-saving machinery.

In the anthracite region there is less reason for their opposition than elsewhere, for the prospects are that the hard-coal mines will never from now on be able to supply the demand existing for their product. Consequently, there is an overwhelming assurance of ample work for everyone, no matter how much labor-saving machinery is introduced.

All of which argument is not an attack on Charles P. Neill, the arbiter of the conciliation board. He is not engaged to settle questions of public polity, but to interpret as best he may a contract in which the operators believed they had written one principle, and in which the mine workers declare they wrote another. However, there is reason to feel that Neill's decision may be attacked as neither in accord with the contract nor with the needs of the public.

The mine workers and the papers in the anthracite region that somewhat naturally cater to them declare it a victory. It is a triumph of conservatism and reactionism against machinery. It puts back the clock; stops it, in fact. We have ourselves been victorious in just such an issue when the noisy timepiece annoyed us by ticking too loudly.

It has been announced that there is a parole agreement to the effect that the operators would use their influence toward the wiping out of the contract system. The same statement is made in relation to car pushing in central Pennsylvania. Such parole agreements—the secret diplomacy of coal mining—if they exist, are unfortunate. It is hard to see an adequate reason for agreeing to do in secret what cannot be agreed to in a contract. Such secret agreements are usually myths invented to excuse bad faith.

We have before us three and a half years of stagnation in methods of mining, as the contract runs for four years. It is certain that so long as the miner must be paid as much per ton for machine work as for hand work there will be no machines used, even though somewhat better coal can be secured by the company where the coal is undercut.

The contract with the mine workers of the anthracite region stated:

Conditions having arisen in portions of the anthracite region necessitating the use of mining machines, the right of the operator to use such machines shall be unquestioned, and the method employed shall be at the option of the operator.

John T. Dempsey, the president of the United Mine Workers in the northern anthracite district, contended that this clause had nothing to do with rates of pay or system of contracting the performance of labor, but simply declared that the company could adopt the room-and-pillar, the longwall or some other method of mining. In short, he urged that it said nothing regarding the wage scale. It referred solely to the physical conditions under which labor should be performed

Company's Claim Followed Contract Closely

But there is also a clause in the contract which states:

Where machine-mining contracts cover the mining of a vein or section of a vein not heretofore mined, the contract rates shall be such as to enable the men employed in mining work to earn on the average of all employed in each occupation a daily wage not less than the rate established for such occupation in paragraph (a).

Paragraph (a) reads

The contract rates at each colliery shall be increased 7 per cent. over and above the contract rates at each colliery effective in April, 1912, as established by the agreement.

It seems clear that the company is empowered to make contracts with individuals at any rate it pleases, but it agrees that the contract shall be annulled if the contractor proves unable to pay his men under that contract a rate of wage averaging that received by men working at like work elsewhere. This is further clinched by what follows

Where mining machines replace contract miners, cutting coal from the solid, the average daily earnings of the contract machine miners shall not be less than the average normal earnings of such contract miners in the territory where the mining machines are introduced, and where the same vein conditions exist, provided that where the average normal earnings of the contract miners are shown to be less than the day rate established in paragraph (a) the machine contract rates shall be so adjusted as to enable the machine miner to earn a daily wage of not less than the day rate established in paragraph (a)

It was argued—and the decision was apparently decided on that argument—that if the company gave a contract to someone to produce coal for a certain price, with certain advantages in the way of machines for cutting and transporting coal, it could not tell with assurance that the miner would produce enough coal that the contractor would earn the stated wage. Hence, by implication, all undertakings not made with the miner himself and for general contract rates violated the general contract and were not permissible. The decision is in direct contradiction to the terms of the general contract

Fairness of the Decision in No Way Evident

It is said, however, that the outcome has given the miners confidence in the fairness of the umpire. It cannot be said to have so convinced anyone else. It is difficult to imagine how a more binding clause could have been written as far as the companies were concerned. The umpire appears to have declined to consider the contract altogether and to have decided on principles of justice which appeared good to him.

Of course, there still remains the possibility of the establishment of a scale rate 3½ years from today such as is now in use in the bituminous regions, but that is a matter for which the public, anxious for larger production and a possible lower cost, must impatiently wait.

It is getting very clear that while piecework when introduced into the industry makes the workman speed up production, it also makes the introduction of improved machinery difficult, and too often it makes the employer indifferent to the efficient work of his employee. All the conservatism of the past is being rapidly transferred from the employer to the workman. It is not a matter for denunciation because all men object to a change, the nature of which they cannot just fathom, but nevertheless the world will suffer if the workman decides that the world must be run without any more machines. Had this been decided definitely years ago, we would not have had the sewing machine or the locomotive. We can easily see how our comfort would have suffered and how the earnings of working men would have remained low.

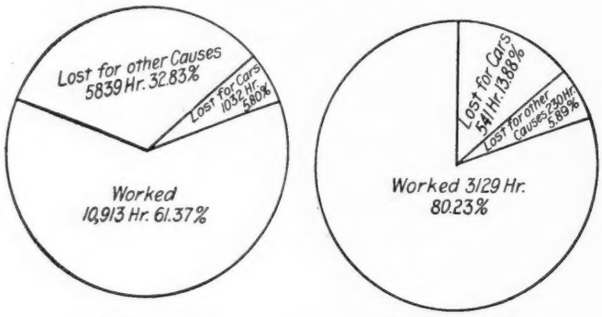
The miners did not really find fault with the contracts the companies were making with the contractors; what they really objected to was the speeding up of the work, the full day demanded and the mining machine. The public has a right to faithful service both as to energy and duration, and to the full advantages of all the mechanical contrivances which the human mind can devise and industry safely use for the cheapening of production. Consequently, it cannot but feel aggrieved at the decision of Charles P. Neill, which is contrary not only to public polity, but also to the wording of the mine workers' contract.

The mine workers, as has been stated, say they had a private understanding. What secret promise was needed if they felt confident that the terms of the document gave them all that the promise assured? Hence neither the secret promise nor the interpretation placed upon the contract by J. T. Dempsey is worthy of a moment's consideration from candid men.

Relative Place of Labor and Railroad in Coal Shortage

Eugene McAuliffe, recently general coal agent of the St. Louis and San Francisco Ry., at St. Louis, Mo., and now the vice-president of the West Kentucky Coal Co., has written to us urging that the loss of time at mines in union districts is more apt to be due to labor conditions than to car shortage. This he illustrates rather than proves in some figures he has compiled. They cover only three weeks of time and a limited area, but nevertheless they are quite interesting.

The value of these figures lies in the fact that they show that the mine worker, the country and the industry might all be better cared for if the mine worker really comprehended what irregularity of working time means to him. The union leaders appear to understand the matter, for they argue constantly that differences must be composed and wage settlements agreed on without strikes, but the miner cannot see that he is losing more than ever he gains by his continued unrest.



Union Mines Nonunion Mines

DIAGRAM SHOWING PROPORTION OF WORKING AND IDLE DAYS WITH CAUSES FOR LATTER

The figures also show that organization into a labor union is a danger to a body of mine workers unless they use discretion to prevent needless and useless strikes. In the scope of Mr. McAuliffe's inquiry the union fields lost 32.83 per cent. of time for other causes than lack of cars, the nonunion fields only 5.89 per cent.

Some time ago a man in the Kansas field wrote "Coal Age" and asked where there was a nonunion field that paid good wages and worked steadily. He said he was tired of the short time which the Kansas mine workers permitted the mines to operate. They were always striking and no one could make money as a miner in the Kansas field.

All union men will surely realize soon, as most of them do already, that too often their own aggression makes unionism a sure injury instead of a possible benefit. The individual has less chance to make a living than before and has less liberty than under nonunion conditions. The violations of contract not only turn operators against the union, but real workingmen also.

This continuous unrest is not an essential part of unionism, as the leaders in the union movement will admit and do in fact strongly contend. Few industries are cursed with as much irregularity in work as the coal industry. Most of them work along, month after month, if times are prosperous, till the time comes to sign a new contract, when the men strike if they find it necessary for the securing of their demands.

Nor do most unionized or nonunionized industries have so many holidays—harvest-home picnics, lodge picnics, abstentions from work for funerals which the abstainers do not themselves attend, circus days and fair days. Among foreigners there are holy days, which include not only "holy days of obligation," but patron saint days and days of lesser observance. The men do not in general attend church but just celebrate, often so liberally that two days are lost instead of one.

But the days lost on strike or suspension are more numerous and important. We must change this condition if we would have prosperity. Especially must this be done when there is a demand for coal. Otherwise we shall have an influx of men into the industry which in more normal times or in the summer it cannot support.

Another matter that Mr. McAuliffe's figures may be held to show is that the railroad is by no means wholly to blame for the coal shortage. His investigation showed that 32.83 per cent. of the time lost at the nonunion mines was lost from other causes than lack of cars, and that only 5.80 per cent. was lost from lack of such equipment. At first blush it would appear that the case of the railroad is conclusively proved, but it must be remembered that if the mine workers worked every day the car shortage would be still more apparent.

But too much stress may be laid upon this view of the case. It is unsafe to say that as there is a shortage of cars the amount of coal produced is dependent solely on that shortage. If when cars are put into the siding the men will not work for some reason, those cars are idle and the tonnage they would have carried during that day is lost. The only safe way to make the most of the short equipment is to work every day that the equipment can be secured.

It may be assumed that all the failure to work when cars were supplied in Arkansas, Kansas and Oklahoma during December, 1916, was due to the determined idleness of labor or to breakdowns. At no time was it for lack of orders. Thus the idleness on days when cars were placed at the mine was almost wholly caused by the workingman. The operator is therefore exonerated. However, the operator in a degree is responsible for his employees, just as the railroad is answerable for its equipment, and so really neither operator nor railroad manager can blame the other without shouldering a little blame himself. But for both parties there is ample defense, whereas all the idleness when cars are actually on the siding is an unanswerable indictment of the idle men, wherever the men are under contract to work.

The figures which we quote from the pages of the "Black Diamond" and the diagrams shown were prepared by Mr. McAuliffe. The union mines considered in these tables and charts are 124 in number and are located on the "Frisco" in Arkansas, Kansas and Oklahoma. The nonunion mines number only 23 and were located on the "Frisco" in the State of Alabama. These 147 mines, union and nonunion together, produce about 6,000,000 tons yearly.

TABLE SHOWING HOURS AND CAUSES OF IDLENESS ON "FRISCO" RY. THE FIRST THREE WEEKS OF DECEMBER, 1916

State	Period	Total Time	Time Worked	No Cars	Other Reasons
Union Districts:					
Arkansas	Dec. 1-7	480	230	178	72
	Dec. 8-14	480	237	185	58
	Dec. 15-21	528	346	22	160
Kansas	Dec. 1-7	4,656	3,113	103	1,440
	Dec. 8-14	4,704	2,892	132	1,680
	Dec. 15-21	4,704	2,687	241	1,776
Oklahoma	Dec. 1-7	744	472	40	232
	Dec. 8-14	744	383	106	255
	Dec. 15-21	744	553	25	166
Total union districts		17,784	10,913	1,032	5,839
Per cent		100.00	61.37	5.80	32.83
Nonunion districts					
Alabama	Dec. 1-8	1,260	977	229	54
	Dec. 8-14	1,300	1,074	165	61
	Dec. 15-21	1,340	10,78	147	115
Total nonunion district		3,900	3,129	541	230
Per cent		100.00	80.23	13.88	5.89
Total all "Frisco" mines		21,684	14,042	1,573	6,069
Per cent		100.00	64.76	7.26	27.98

Mr. McAuliffe says that the item "Lost for Cars" includes all losses for which the carrier is responsible, however they may be caused. He well states that a 10 per cent. shortage will create a coal famine. That being so, surely the coal industry, operators and mine workers together, have a responsibility to apportion when 32.83 per cent. of the possible tonnage in certain union districts and 5.89 per cent. in certain nonunion districts are lost from causes in which the carrier is not a factor.

It is safe to say that in December, 1916, it was the mine workers of the Southwest and not the operators who caused the shortage. There was no general strike; there were ways provided whereby differences could be settled peaceably. So why were the mines idle? The workingmen have only to give the matter their consideration to arrive speedily at a solution.

Editorials

Who Is To Blame for the Inadequate Coal Supply?

Three parties are to blame for the coal shortage—the consumer who delayed his buying, the railroad that is short of equipment and the mine worker who has been taking holidays contrary to contract, who has struck—sometimes contrary to his pledge and sometimes at non-union mines—and who worked less than the full 8-hr. day.

All three have a defense more or less excellent. The buyer will declare that he should have been induced to buy by an adequate differential, and he will add that in regard to anthracite and to the Southwestern coals he would not have been able to get the coal even had he clamored for it in the summer—at least not without depriving someone else.

Some railroads will say that they have been starved by the Interstate Commerce Commission so that they cannot possibly supply themselves with necessary equipment. Some railroads will allege that their equipment was held by other roads and that their own preparedness served them little. Moreover they will all say that there has been loss of efficiency, owing to the excessive reconsignment of cars.

The United Mine Workers of America has given to the public the following statement in defence of its position:

> We wish to point out that the present coal shortage and the consequent high prices that are being charged for coal can in no wise be attributed to the United Mine Workers of America.
>
> No strikes are in effect that would have a tendency to limit the supply of fuel, and our members everywhere are responding with unanimity to their duties as mine workers whenever opportunity to work is given them.
>
> Unfortunately, many of them have been denied steady work because railroad cars have been commandeered and used to transport munitions of war and other commodities, and a car shortage at the mines has limited the production and depleted the supply of coal in the markets.
>
> When conditions have been remedied and our members are permitted to work full time, the coal shortage will be relieved greatly, and the present unusual condition of the coal market will approach normal again.

There is some truth in this statement. If the strikes were all ended, the mines would supply but little more coal, for the idle mines do not draw on the car supply except in a few cases. What is lost at the idle mine is gained at the working mine.

But it is true that in regard to anthracite the mine workers could have saved the situation considerably had they worked steadily the year through. Short strikes and holidays have interfered with car efficiency. There has been much of this short-time idleness in the anthracite region. When a mine goes on strike the cars, for a while at least, lie idle on the sidings; and on a holiday all the empty cars have to be kept idle over that day.

As the anthracite region is equipped with railroad cars for almost everyday work at full capacity, the anthracite tonnage has undoubtedly been lowered by the striking and holiday-taking tendencies of the mine workers. These men are doing far better now than before, but the effect of the slack summer cannot be overlooked. The evil is done: it may be atoned for by steady work in the winter, but the loss of time cannot be corrected.

In the bituminous regions the trouble in general seems to be largely due to car shortage. The production, despite strikes and loss of men, seems to have been larger than ever. Had the labor shortage been less the car shortage would have been greater.

There is no occasion for vituperation. What we need is to find a way in which to mend the buyer, the railroad and the mine worker so that the supply and the demand will be regulated to each other. It is not impossible to find a way if we use coöperation. So long as we worry ourselves solely about the needs of the operator and consider only the duties of the buyer, the railroad and the mine worker we shall not progress. Success will come only when we recognize also the duties that the operator has to face and the needs that puzzle the buyer, the railroad and the mine worker.

The operator should aid the buyer by scheming a differential by which the consumer will find it profitable to buy in the summer; he should aid the railroad by advocating equitable freight schedules sufficient to make railroading profitable, so that the necessary equipment may be provided; he should assist the mine worker by recognizing the economic facts in relation to wages, assuring him that at each contracting period without striking he will get a wage based on the cost of living and also a friendly hearing and a due consideration of his complaints. Then the consumer will buy more freely in the summer, the railroads will have equipment with which to respond to sudden demands without stealing cars from one another, and the mine worker will be in better humor and do his level best to put out a large tonnage.

The Coal Shortage in the Central West

An admittedly serious situation has confronted both the producer and the consumer of coal in the Central West and Northwestern states for the past several weeks. As is always the case, the trouble is owing to the fact that the producers and carriers are expected to do twelve months' business in six months. In addition, these six months are the worst there are from a railroad standpoint, occurring when wintry weather renders impossible the normal operation of the country's transportation facilities. No doubt the large tonnage of coal offered for movement during these months at times slows up the transportation systems, and at others blocks some of the carriers entirely.

As has been repeatedly pointed out, a good way in which to relieve such a condition is by educating the public to buy its coal during the summer months, when most Western mines are idle two-thirds of the time. Indus-

tries and railroads must provide storage facilities, and more coöperation must be exerted on the part of consumers.

Beyond doubt the railroads have enough equipment and other facilities to take care of any demand, were the coal moved in something like equal amounts during each month of the year. In the spring and summer months coal equipment lies idle, awaiting the season of overwhelming demand during the winter months. In a measure the same situation applies to the retail coal dealers; they have plenty of wagons and trucks to handle their business, but not when it comes all at once, in a few months. If the public and the steam trade exercised as much preparedness in the buying of their fuel supplies as they do in their other affairs, the mine operators and carriers would not be confronted by a situation like that which has existed throughout the West during the past few months.

The recent embargo by a number of Eastern railroads on the movement of West Virginia coals to Chicago and other Western points emphasizes the necessity of educating the Western public to burn Western coals. In Chicago nearly every heating plant burns Pocahontas or smokeless coals, when it has been established many times over that Western coals could be used just as satisfactorily. The Illinois operators could convert their coal into a smokeless fuel were demand sufficiently stabilized over the entire year, and if this should occur it would probably only be a question of a few years until little Eastern coal would be shipped into Western territory.

Drastic Action Against the Railroads in the Middle West

Two orders issued by the Illinois State Public Utilities Commission are expected to materially relieve the coal shortage that has recently threatened Chicago. The orders were entered on Jan. 18, after a conference of railway officials called by Chairman William O'Connell in an effort to end the unfortunate congestion at the railroad terminals.

The first of the orders provided that coal was to have the right of way over all other commodities except live stock and perishable freight for a period of 48 hr., beginning at five o'clock Jan. 19, the railroads voluntarily offered to keep the order in effect for four or five days if necessary. The roads further adopted the suggestion that switching be eliminated in local yards so far as it is practicable, and deliveries will be made directly by the engines of the line on which the coal moves into the switching yards.

The other order, entered in the reconsignment case, which has been on hearing before the commission, is opposed by the wholesalers and operators. It provides for a second reconsignment charge of $2 and $5 for a third, which the shippers claim is virtually a confiscation of their rights.

The commission on Jan. 18 refused to comply with the request of the carriers that the reconsignment privilege be withheld during the period that coal is made preferred freight. The position was taken that this would prevent delivery in the city of all coal not originally consigned to Chicago, and the commission contends that this action will make speculative holding of coal unprofitable, which, of course, hits some jobbers who have been making from 50c. to $2 per ton on consignment coal.

A tremendous amount of tonnage was rushed into the city on Jan. 19, and Chairman O'Connell of the Illinois Commission stated that he believed in four days' time the milder weather and the measures the commission had taken would bring the local situation to something near normal.

After the above mentioned conference, the railroad executives sent instructions to every agent on all the coal lines entering Chicago to do everything in their power to hurry shipments.

Retail dealers will now be given an opportunity to stock their yards if the railroads comply with the order of the utilities commission. Although the danger of a sudden cold wave still exists, the present congestion will be relieved if the carriers in the terminal districts fulfill their promises. Wholesalers express the view that if the roads give preference to the transportation of coal it will enable bare yards to be stocked immediately. The high charge for reconsignment which the commission allowed is probably unjust, but it will have a good effect eventually. The action of the roads in adopting unanimously the recommendation of the commission that coal be given preferred movement was hailed with joy by consumers, who now see relief from a situation that threatened dire consequences.

The Anthracite Shipper Versus the Coal Dealer

With the rapidly dwindling stocks of anthracite, complaints by the dealers at the inadequate shipments have become more loud and bitter. Threats of changing over to new shippers when normal conditions return are even more numerous than during the great strike of 1902. It is interesting, therefore, to examine the basis on which some of these complaints are founded.

A representative of one of the large individual operators states that the most bitter criticism of his house has come from trade which had absolutely no claim on it. In ordinary times this company frequently sells blocks of coal to dealers at indirect concessions as for instance, by protecting them at May circular throughout the summer. Yet these same dealers entirely ignored them when full prices were asked in the fall, claiming their coal was not up to the standard of the big companies.

This seems to be the class of trade that is now calling attention to the number of tons bought in former years and complaining the loudest at the small recognition accorded them the past three or four months. The threats of vengeance from these dealers are not being taken seriously, as the individuals well know that their only control over such trade is based on price alone.

It is an accepted fact that if it were not for the very large stocks carried in storage by the big companies the anthracite-consuming public would be experiencing a serious shortage of fuel at this time. In fact the scarcity would be even greater than during the 1902 strike. At that time the domestic consumers drew heavily on the bituminous shippers, but with soft coal now even higher in price than anthracite, such a course is not possible and the real need of the big storage yards is apparent.

It is to be regretted, however, that the big companies have discontinued the practice of rescreening their storage coal before loading. This practice makes the buyer more anxious than ever to get the bright, fresh-mined coal.

Discussion by Readers

Explosion in Clearfield District

Letter No. 1—In discussing the explosive combustion of coal dust, *Coal Age*, Jan. 6, p. 28, W. H. Noone conveys the impression that coal operators in the Clearfield region claim that there has never been a coal-dust explosion in their mines.

Although I have not always been located in the Clearfield region, I well remember that 21 years ago an explosion occurred in No. 7 shaft, owned and operated by the Berwind-White Coal Mining Co., at which time four men were badly burned. I am well acquainted with two of these men, whose names and addresses are: Daniel Kough, Windber, and William Copenhover, Smiths Mill, Penn. The names of the other two men were, I think, Jacob Callahan and Robert Haylett.

The two men first mentioned are living witnesses of that awful night when the explosion occurred. They were taken to their homes, while the other two were cared for at the hospital. That this explosion occurred in one of the Clearfield mines is proof that the claim of immunity from explosion in that field is false.

It seems strange that many men try to persuade themselves and others that conditions in a dry and dusty mine are safe and no fear need be entertained of an explosion taking place. Why not, instead, believe that an explosion is always possible, and not make statements that are, to say the least, misleading? I am sorry to think that too many of our mine officials discourage their employees from making any report of dangers they know exist in their mines.

At Imperial Mine No. 4, of the Maryland Coal and Coke Co., there is a sign over the bulletin board that reads something like this: "Stop! Think! And say have you seen any dangers today."

The mine foreman in charge of this mine encourages every employee to report anything that he may think is dangerous. In that way he hopes to reduce the number of accidents to the lowest possible limit. Let us not encourage the chance-taker, but adopt every precaution for safety in the mines.

S. D. HAINLEY.

Osceola Mills, Penn.

Textbooks in Examination

Letter No. 10—I have followed with interest the discussion of the use of textbooks by candidates in examination, and believe that the ground has been fairly well covered by the several letters that have been written.

As Alexander Waugh has suggested in his letter, *Coal Age*, Jan. 13, p. 108, it would be well to understand what is meant by the word "textbook." While I would exclude from the examination any book giving the solution of mining questions, I am in full accord with the idea that a proper form of memorandum book, containing formulas, constants, etc., would be a great help to practical men who find it difficult to memorize formulas and other data.

Let me ask, What is our idea of an examination? Is it not to satisfy the board of examiners that a candidate for a certificate of competency is capable of filling a position as mine foreman, assistant foreman or fireboss in a mine? It is not to be supposed for a moment that examiners want to test the ability of men to memorize technical data, which requires a trained mind.

When it comes to handling a mine, give me the practical man who has risen from the ranks and not merely a student of mining whose experience underground is limited. Before coming to this country, I attended a mining school in South Wales and, later, succeeded in passing the first-class mine-manager's examination held at Cardiff. The test given was a comparatively simple one; otherwise, I could not have passed, as mining formulas were at that time Greek to me.

On coming to this country I employed the five years required to become a citizen in the study of mining textbooks and became interested in learning the development of mining formulas. I committed to memory the three simple formulas,

$$pa = ksv^2 \quad (1)$$

$$q = av \quad (2)$$

$$u = pq \quad (3)$$

Then, I learned that multiplying both members of Formula 1 by v gives

$$pav = ksv^3 \quad (4)$$

Finally, combining formulas 2, 3 and 4 gives

$$u = pq = pav = ksv^3 \quad (5)$$

Few practical mining men, however, can memorize even these simple formulas, which form the basis of all calculations in mine ventilation. The work in examination is so different from the customary daily employment of these men that their nerves are unstrung when taking the test, and the attempt to remember what they had previously committed to memory is fruitless.

Recently, one of the most efficient mine managers in this state, who holds a service certificate, told me that if he had to sit for examination at Springfield he would be unable to pass. I know of others who hold service certificates, but who are not worth their salt in the management of a mine.

With our mines growing deeper and more gaseous, and the output of coal increasing, there is a growing demand for greater efficiency in mine management. The type of man needed underground today is one that has a practical knowledge of mining. Since these men must also possess technical knowledge, the means should be afforded that will enable them to handle the questions asked in examination on the same basis that they would employ in their daily practice.

It would hardly seem necessary to include in a book of formulas and constants to be used by candidates in examination tables of sines, cosines, etc., but when angles are involved in the solution of an examination question, the values for the sine, cosine, etc., of those angles could be stated in the question. I think it only right to allow the candidate the use of such a book of formulas and

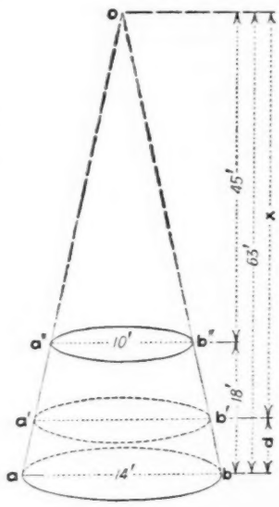
constants. Also, I feel that he should be permitted to use any slide rule, parallel ruler or protractor that he may need in answering the questions asked. In so doing, the candidate is only working with the tools that he would use in daily practice. I agree fully with what has been said, that, in the examination, every candidate should work under the same conditions that surround him in the office or at home.

In closing, permit me to say that I believe in maintaining a high standard in the examination, which should include questions that will test severely the candidate's practical ability to manage a mine that is equipped with thoroughly uptodate machinery and appliances, since there is no telling but he may be called upon to take charge of such an operation at any time.

East St. Louis, Ill. PRACTICAL.

Contents of Water Tank

Allow me to suggest a solution of the problem to find the depth of water in a conical tank having a diameter of 14 ft. at the bottom and 10 ft. at the top, when the tank is half-full, the height of the tank being 18 ft., which appeared in *Coal Age*, Jan. 13, p. 113. The solution appeals to me as being simple and arriving directly at the required result. It is as follows:



Referring to the accompanying figure, complete the cone by extending the sides of the tank *a a''* and *b b''* to the apex of the cone at *o*. Then, since the diameter of any right section decreases at the rate of 14 — 10 = 4 ft. in 18 ft., or 2 in 9, the full height of this cone will be $9 \times 14 \div 2 = 63$ ft.; while the height of the extended portion above the tank is 63 — 18 = 45 ft. The volume of the complete cone *a o b* is therefore

$$Vol.\ a\ o\ b = \frac{63}{3}(0.7854 \times 14^2) = 3232.7\ cu.ft.$$

In order to calculate the volume of the frustum of this cone represented by the tank I prefer to use the prismoidal formula and multiply the sum of the areas of the upper and lower bases and four times the area of the mean base half-way between the two, by one-sixth of the height of the frustum, which, in this case, is $\frac{1}{6}(18) = 3$ ft. Then, since the radii of the upper and lower bases are respectively 5 and 7 ft., that of the mean section half-way between the two would be 6 ft., and we have for the volume of the frustum, which is the volume of the tank,

$$Vol.\ of\ tank = 3 \times 3.1416(5^2 + 4 \times 6^2 + 7^2)$$
$$= 2054.6\ cu.ft.$$

One-half of this volume is 1027.3 cu.ft.; subtracting this half-volume of the tank from the volume of the complete cone gives, for the volume of the cone, *a' o b'* 3232.7 — 1027.3 = 2205.4 cu.ft. But these cones being similar, their heights are proportional to the cube root of their volumes. In other words, the height ratio is equal to the cube root of the volume ratio; and we have for the height of the cone, *a' o b'* denoted by *x*,

$$x = 63\sqrt[3]{\frac{2205.4}{3232.7}} = 55.46\ ft.$$

Finally, the depth of the water in the tank when half-full is 63 — 55.46 = 7.54 ft. E. C. DODSON.

Johnstown, Penn.

Gathering Experience

Letter No. 1—I was much interested in the suggestion of J. F. K. Brown, on the matter of gathering experience that would be of benefit in the operation of a mine, *Coal Age*, Nov. 18, p. 830. By way of explanation I want to add a word of how a mine foreman can gather experience by visiting other operations and still retain his position at the mine where he has charge.

It is well known that a mine foreman's duties are such that there is small opportunity for him to get away for a day, to say nothing of two or three days, which might be the length of time required to visit some places where an uptodate installation or equipment bids fair to widen his experience and his knowledge. However, the gaining of new ideas in the operation of a mine is of such importance today that every mine foreman should strive to so arrange matters that he can make such an occasional visit without interfering seriously with the operation of his own mine.

Where a mine foreman has trained his assistant foremen in such a way that they are able to assume his responsibilities for a day or so during his absence, the operation of the mine will not be seriously handicapped. This will give the foreman an opportunity to make visits to other mines and gain the information he desires. While many things that he will observe may be inferior to the methods employed in his own mine, a foreman will often find much that is superior to the means employed at home. What he sees in another mine will often suggest improvements in his own methods or equipment, and the time thus spent will not be lost or the expense of a trip wasted.

A foreman may argue that the coal company would consider him ignorant and incompetent if he suggested going elsewhere to seek information on matters that he is supposed to know. In my opinion, however, a company would rather employ a man who is always on the lookout for better, safer and more economical methods of mining, hauling and loading the coal for shipment. Companies today are not wanting men who are satisfied with what knowledge they have.

When visiting friends in other towns I never fail to devote a portion of my time to looking through the mine and studying their equipment. I have always found that this has been time well spent. It is a give-and-take proposition, for a man who is seeking information must be just as ready to give information when he can. On the occasion of such visits, where the foreman was a stranger to me and I to him, we have always parted friends.

No doubt some foremen will claim that they are "too busy," or that "something may happen" while they are away. I believe, however, that in most well-managed mines where the foreman has trained his assistants, as I have stated, to assume the responsibilities of operating the mine for a period, he can go away without being worried about a possible breakdown or accident result-

ing from his absence. In most cases, in a mine so managed things will move along as smoothly as though the foreman was on the job. W. R. JONES.

Ohio Pyle, Penn.

Schedule in Motor Haulage

Letter No. 1—Some time ago I remember reading, in *Coal Age*, of a mine where the motors ran on schedule time. This appealed to me as a matter that should receive more attention in all mines where motor haulage is employed. Mine foremen anxious for a good output realize more than anyone else that much precious time is lost by motormen having to wait for one another where a single-track system is in use, as is commonly the case.

In a mine where I was employed the time lost by motors waiting at meeting points ranged from one-third to

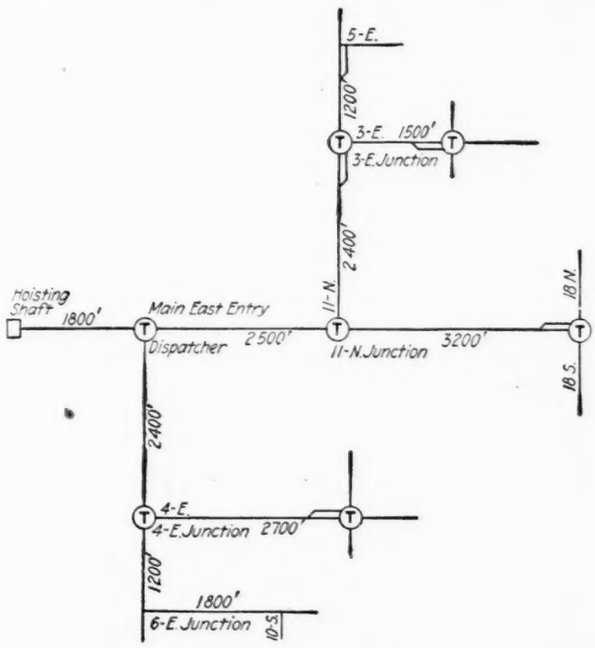


DIAGRAM OF AN EFFICIENT HAULAGE SYSTEM

one-half of a working shift and I understand that it has, at times, been worse than that. I know of another mine where a dispatcher called a "switchman," directs the movements of all trips by means of telephone connection throughout the mine. The result is less danger and loss of time, as motormen are advised if the track is clear and know whether they must run with caution or can use a greater speed. The system also quickly reveals where there is any trouble that has caused delay on the road and needed assistance is promptly afforded.

DESCRIPTION OF THE SYSTEM

In the case to which I refer the system varies from that in general use. Instead of each motor hauling from a particular sidetrack or parting, as is the common custom, the motors haul from any sidetrack to which they are sent by the switchman. Inasmuch as the haulage system in this mine is extensive, employing three 10-ton haulage motors and 21 mules for gathering the coal in the workings, it will be of interest to briefly describe the arrangement, which is shown in the accompanying figure.

The switchman is located on the main east entry, at a point 1800 ft. from the shaft bottom, where a road runs due south, 2400 ft. to the 4-E junction. At this point a road extends due east 2700 ft. to the 4-E sidetrack and 1200 ft. due south to the 6-E junction. From the last named point a road extends due east 1800 ft. to the 10-S.

From the switchman's office on the main east the road extends 2500 ft. due east to 11-N junction and 3200 ft. farther east to the 18-N sidetrack, where entries are turned north and south. From the 11-N junction the road extends 2400 ft. due north to the 3-E junction and 1200 ft. further north to the 5-E sidetrack. From the 3-E junction the road runs due east 1500 ft. to the 3-E sidetrack.

The figure shows only a skeleton of the main haulage road. Telephones are indicated by a T in a circle. Four mules are used for pulling coal to each of the five sidetracks shown in the figure, and one mule is employed as a "rouster" to keep the turns square on all the entries. The mine cars have a capacity of 2 tons, but are seldom loaded to that extent. A regular four-mule trip is 25 cars and a five-mule trip 30 cars. There are few steep grades in the mine and a locomotive can easily pull a trip of 30 cars.

A REGULAR SCHEDULE MAINTAINED

As far as possible a regular schedule is maintained, trips arriving on the shaft bottom at stated intervals. The miners are distributed in such a way as to give each sidetrack about the same number of cars a day. In the morning the men are hauled from the shaft bottom to the nearest junction point where a load is ready for the motor. For example, No. 1 motor starts from the bottom at 6:45 a.m. and pulls men to the 3-E sidetrack on the north side. No. 2 motor follows, leaving the bottom about 5 min. later and going to the 4-E sidetrack on the south side. Again, No. 3 pulls a trip to the main east sidetrack at the 18-N and S entries.

Having coupled to a loaded trip, No. 1 motorman calls up the switchman and gets orders to proceed to 11-N junction. No. 3 motorman knows he has a clear road to the 11-N junction and, from this point, the switchman gives the right of way to one of these motors, which proceeds at once to the shaft bottom. In addition to the phone call the switchman shows a white light to indicate a clear track, while a red light signals the motorman to stop and a green light to run slowly with caution.

No. 1 motor, on reaching the bottom first, takes an empty trip next to the 6-E south side. No. 2 motorman follows and takes a trip of empties to the 11-N. The empty trips are thus distributed in order to those sections of the mine that have had more time to load their coal, the switchman keeping in touch with the conditions in each section.

As each trip is brought to the bottom, the motorman marks on a bulletin board the number of loads hauled and from what sidetrack they were taken. He also marks the number of empties taken and where. The board, moreover, shows how many cars are still left on each sidetrack. This information enables a motorman to tell how many empties are needed and he governs himself accordingly.

At the close of the day each motorman is obliged to fill out a form showing the number of empties and loads

hauled to and from each sidetrack that day. This report is turned in to the switchman and he, in turn, makes out a full report to send to the superintendent, keeping a carbon copy for his own use. The report shows the time lost by each motorman.

ADVANTAGES OF THE SCHEDULE

Besides being a good check on the output of the mine, the reports serve to inspire each motorman to put forth his best efforts to maintain a good record. Also, the drivers work hard to have the trips ready for the motorman when he comes. The system is the most complete of any in my experience and keeps the superintendent informed of any lack in the performance of duty by every man in the mine.

By the rules of the mine no trip is allowed to leave a sidetrack unless a marker is first hung on the back of the last car. No motorman can pass a junction point without receiving orders from the switchman at the main junction. Not more than one trip is allowed on the section between the shaft bottom and the main junction at one time, and trips are not permitted to run within less than 5 min. of each other. A motorman failing to report that his motor is out of order when he leaves at night will be laid off for one day. For the third offence he will be discharged.

The scheme has been very successful in giving a good output of coal with a small margin for delays. The mine averages 33 motor trips of 25 cars each, making a total of 825 cars, or a daily output of about 1500 tons.

Herrin, Ill. OSTEL BULLOCK.

Is Creosoted Timber Combustible?

Letter No. 1—The reference to a fire said to have occurred in a slope in which creosoted timber had been alternated with untreated timber, *Coal Age*, Dec. 23, p. 1045, calls to mind an incident that occurred some years ago in my own experience, which is as follows:

On one occasion, when I was employed running an engine at a large coal mine in the Wyoming Valley, two cars of mine timber that had been creosoted were unloaded within 75 ft. of the engine house and in my direct line of vision as I stood at the throttle. The timber was intended to be used in one of the main intake airways of the mine.

One evening a small mine locomotive came up the track spitting fire from its stack. A hot coal thrown into the air dropped on this pile of creosoted timber, and, in less than two minutes, there was a dense volume of smoke rising toward the sky. The volume of smoke was beyond comparison but resembled that of three or four big locomotives when pulling a train up a mountain grade. From this suggestion most mining men can imagine what the spectacle was like.

I have often wondered what would have been the result if this timber had been framed and set up 3 or 4 ft. apart in the intake airway of the mine and, later, caught fire from a miner's lamp hung for a moment on one of the posts, as miners are wont to do, or from any other cause. The terrible results can easily be imagined if this had happened while the men were at work in the mine. It would not then have been possible to shut off the air by closing the mine opening, as was done in the instance to which I have referred, and the dense volumes of smoke resulting from the combustion of the creosoted timber would have filled the workings in a short time and given the men no opportunity for escape.

While the preservation of timber is important in mining, the treatment should be such as to render the wood incombustible and not make the process a menace to life. Some 35 years ago, when I was a boy, I remember that the company operating the mine where I worked used a mixture of cement and sand and sprayed this over the timbers in the shaft and gangway, for the purpose of preserving the wood and as a protection against fire. The result was that the timbers became like rock itself. W. A. BARRETT.

Nanticoke, Penn.

[The suggestion of this correspondent is a good one and leads us to ask why the cement gun that has, within a few years, been so largely used as a means of fire protection for buildings, would not prove equally valuable as a preservative of mine timber, while at the same time affording needed fire protection underground, in gangways, pumprooms, enginerooms, and tool shanties. This question is worthy of careful consideration and we hope it will be discussed further.—Editor.]

Bonus System in Mining

Letter No. 10—I regard the giving of a bonus for good work as very much in the nature of a Christmas gift and that it concerns no one beyond the giver and the receiver of the bonus. Any right-minded man will not feel hurt or jealous because a fellow worker is given a bonus that he has earned.

There are many things to be considered in adopting a bonus system that will be just to all and give every worker an equal chance to increase his earnings. No man should be eligible for a bonus who performs his work in a manner that results in the injury of another employee or damages the mine equipment by reason of an accident that could have been avoided with proper care.

Few realize the perplexities of a foreman who is responsible for maintaining the output of the mine from day to day, month to month and year to year. In order to do this he must keep a sharp lookout. He must deal with all kinds of men and, of these, some are too slow, while others move with reckless haste in whatever work they have to perform. For his own protection, a mine foreman must surround himself with good, honest, straightforward and faithful men, who can be depended on to perform their several tasks with safety to themselves and others.

It is no easy job to handle from 600 to 700 cars of coal a day when hoisting from a fairly deep mine. To do this things must run smoothly; the cage must not be held long at any one landing; the mine locomotives must make their trips regularly; or, where rope haulage is used, there must be no delay in changing trips on the inby parting or at the shaft or slope bottom.

One can readily imagine the discomfiture of the mine foreman whose hope for making a record output for the day was suddenly dashed by the accident due to the reckless driving of the motorman called "Red," cited in Letter No. 8, Dec. 30, p. 1099. Evidently this motorman

did not obey the injunction of Dave Crockett, "Be sure you're right and then go ahead." With a half-dozen lives endangered and 16 cars smashed to kindling wood, this man is more a candidate for the "penitent stool" than deserving of a bonus. The cost of his recklessness, which destroyed 16 cars worth $50 each, to say nothing of the delay and consequent loss in output and track repairs, would cover many bonuses. Such men are no help to any foreman, but a hindrance and danger in the mine.

In contending with conditions surrounding him the mine foreman should be given every consideration by the management and permitted to have full swing in his battle underground. He should, of course, confer and receive the sanction of the management in what he proposes, but means should be at his disposal to reward honest, faithful work.

The miner who works the greatest number of days, has the best record for freedom from accidents, and has loaded the most and cleanest coal during a certain period, should be in line for a bonus.

The driver who hauls the largest number of cars a given distance, without accident to his mule, himself, or others, and the motorman who performs a similar service without injury to his motor or harm to any employee should, alike, be eligible for a bonus.

The fireboss who has provided ready places for the men in his section, kept them constantly employed, and maintained the most uniform output of coal from day to day, while showing the lowest accident rate, should be rewarded for the faithful performance of his duties by a bonus.

Assistant foremen, rib bosses and boss drivers are alike candidates for a bonus for efficient service and good results, as shown by the coal handled and freedom from accidents.

All of this, however, contemplates the willingness of the management to adopt such a system in the operation of the mine and to grant bonuses for the faithful performance of duty by honest, industrious workers.

West Leisenring, Penn. ROBERT W. LIGHTBURN.

Mine-Accident Record

Letter No. 6—Speaking of accidents due to the careless use of powder, I recall one instance where a miner was filling his cartridge with his light on his head when a spark dropped into the powder, ignited it, and the explosion of the cartridge fired what powder remained in the keg. The poor fellow was so badly burned that he died the same day. When we think of the number of miners who fill their cartridges with their light on their heads, others who smoke on their toolbox, which contains their powder, it is astonishing that there are not more accidents from this cause.

I recently heard of a remarkable escape of a miner who had filled his cap with powder, when his lamp dropped off his head into the midst of the powder. It fell in an upright position and, being a carbide light, no spark dropped into the powder and the flame did not come in contact with the explosive.

Another miner who followed the same practice was not so fortunate. This man, like the miner just mentioned, would empty the powder from the keg into his cap and from his cap he would fill his cartridge. On this occasion he had nearly a full keg of powder. He set his light all too carelessly on a rock on the gob wall and, just as he had filled his cap with powder, the lamp rolled off the rock into the cap of powder, setting it off and the remainder of the powder in the keg. The poor fellow had hardly a rag left on him after the explosion and died within 24 hours.

I will cite three accidents that occurred from ramming powder into the hole. In one case that happened some years ago, the miner was tamping the hole with the bar in front of him when the powder ignited and drove the bar through the body of the unfortunate miner. In another case the miner had the keg of powder close to the hole, his practice being to fill his cartridges at the hole instead of at the powder box. On this fateful day the cartridge stuck in the hole and the miner used the sharp end of the tamping bar with the result that the powder in the hole ignited, and the flame of the explosion touched off the keg standing near and the unfortunate miner was killed.

In the third instance, the drillhole encountered a sulphur ball on one side of the hole and the miner attempted to force the cartridge past this obstruction with the tamping bar. The cartridge exploded and the poor man lost the sight of both his eyes. It seems a great pity to think that miners will run such chances when these accidents are easily preventable.

CRIMINAL MISMANAGEMENT UNDERGROUND

About the most pitiful case that came to my notice was one which the mine manager (foreman), mine examiner (fireboss) and the miner were alike to blame. The practice of the mine examiner, on detecting gas in a working place the first day, was to put two ties across the track, enter the report of gas in his book, take the man's check from the board and give it to the mine manager, whose duty it was, under the law, to notify the miner of the condition of his place. The man was then expected to remove the gas from his place as best he could before proceeding to work.

On detecting gas the second day the mine examiner would place one tie across the track and enter the report of gas in his book; but the miner's check was not taken from the board and he was not notified that gas was in his place, except by the single tie across the track. The miner would then remove the gas by brushing.

This particular working place was 9 ft. wide. The day before the accident the turn was very slow, and the miners would then throw back the coal from the face so that they could prepare their holes to shoot that night. In the miner's place the coal thrown back filled the road, leaving only a space 2 ft. wide for him to crawl through.

The following morning the mine examiner reported gas as usual, and placed a single tie across the road as notice that gas was in the place. It is easy to imagine what occurred when the miner attempted to brush out the gas from behind the coal, leaving his light on the entry.

Supposing the gas was gone, he called for a light. The unfortunate man was caught like a rat in a trap. His shirt was burnt clean off his back by the flaming gas, which ignited on his lamp. He looked a pitiful sight when I last saw him, his back, face and the upper part of his chest being severely burned.

W. L. MORGAN,
East St. Louis, Ill. Former Mine Inspector.

Inquiries of General Interest

Construction of Mine Overcasts

Kindly explain the construction of a standard type of overcast in a 6-ft. coal seam, having a sandstone roof, the entries, airways and breakthroughs being all 12 ft. wide and the full height of the seam. I should like to see this question discussed and get the experience of *Coal Age* readers who have developed a standard type of construction that has proved both economical and serviceable in the mines.

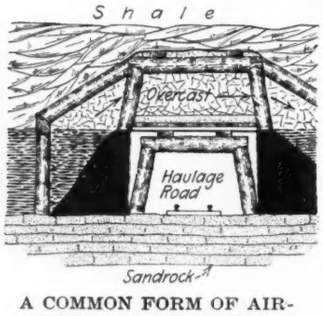
HENRY GROOS,
Civil and Mining Engineer.

Harlan, Ky.

Formerly, less attention was given to the building of air-bridges; but, with the greater development of coal mines and the need of more efficient ventilation at the working face, the construction of air-crossings became imperative. With this increased demand, the type of construction rapidly improved.

At one time, the practice of driving an air-crossing through the natural strata overlying the haulage road, and wholly separated from it, had numerous advocates. This type of air-crossing, however, soon fell into disuse in this country, owing both to the expense of driving a considerable length of entry in rock strata and the belief that the solid formation presenting, as it does, an unyielding resistance in case of an explosion occurring in the mine, would act to increase the destructive force in the mine workings.

A common form of air-bridge, or overcast, for conducting an air current across the haulage road in a mine, is shown in the accompanying figure, which needs little explanation further than to say a sufficient excavation is first made in the roof strata at the desired point in the haulage road and extended a short distance on either side of the road, where it is sloped downward to connect with the airways on both sides. A bridge is then formed over the haulage road by placing iron rails of sufficient strength across the opening made in the roof. Planks are laid on these rails so as to form a bridge, which is the floor of the overcast. The planks are laid close together and all joints sealed with fireclay so as to make them air-tight. The entire floor is then covered with from 4 to 6 in. of sand or ashes to further prevent the leakage of air into the haulage road.

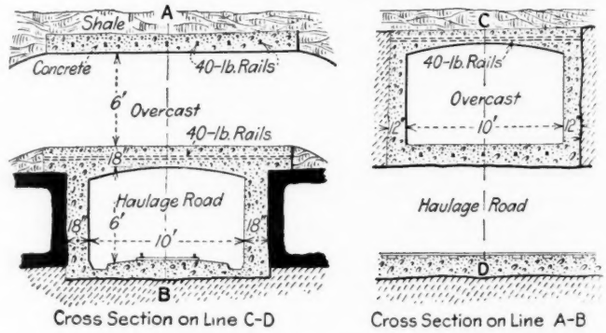


A COMMON FORM OF AIR-BRIDGE, OR OVERCAST

As shown in the figure, a substantial timber frame is set so as to form a solid square above the bridge and properly support the roof over the excavation. This type of air-bridge has the advantage of being inexpensive and sufficiently yielding not to be materially injured by a slight movement in the strata. It is easily repaired, should the bridge be destroyed by the force of an explosion.

On request, the following description of a standard concrete overcast has been prepared by Forney L. Parker, Mining Engineer, Pottsville, Penn. Mr. Parker states that an overcast should have at least the same area as the airway on which it is constructed and provision should also be made for a possible enlargement of that airway, whenever this is likely to occur in the future.

A concrete overcast makes a permanent piece of work. It is needless to say that if the section of the mine involved is liable to squeeze, this form of construction would be practically useless, because the movement of the strata incident to the squeeze would crack or crush the concrete structure, which would leak badly if it did not fall. In such cases Mr. Parker recommends the building of a timber air-bridge of heavy planks, similar to what has just been described, covering the joints with 3-in. battens and making them air-tight with a plaster formed of a mixture of lime, coal dust and water.



SECTIONS OF STANDARD CONCRETE OVERCAST

When the roof is sandstone, as in this case, Mr. Parker thinks it would be better to drive the overcast wider than the entry to reduce the cost of excavation. In regard to the cost he states that the construction of a concrete overcast, aside from the excavation necessary, may be estimated on the basis of 192 man-days of skilled labor and the same amount of unskilled labor. To this must be added the cost of the material used in construction, including the 40-lb. iron for reinforcement of the air-bridge, as shown in the figure.

The cost of material fluctuates too rapidly to set a standard price, and the cost of labor will depend on local conditions. Experience has shown, however, that the costs of labor and material bear a more or less fixed ratio to each other, under fairly normal conditions. For the purpose of estimate, this ratio may be assumed as practically 2.6. That is to say, taking the cost of material as unity, the cost of labor for construction work would be, say 2.6, exclusive of the cost of excavation. In other words, for every ten dollars expended for material it is fair to estimate on an expenditure of twenty-six dollars required for the labor of construction.

Examination Questions

Tennessee Mine Foremen's Examination Held Oct. 9-12, 1916

(*Selected Questions*)

Ques.—How are gases caused to expand out of the strata and at times overflow the workings of a mine?

Ans.—The gases occluded in coal formations exist there under more or less pressure, which tends to drive them out of the strata as the excavation proceeds. At times this pressure is sufficiently great to cause a sudden outburst of gas, which is so violent as to throw down the coal at the working face or dislodge portions of the roof slate, or even cause the floor of the excavation to heave, these results depending on the location of the gas in the strata and its pressure.

Ques.—What is the composition of blackdamp and what is it called other than blackdamp?

Ans.—Blackdamp is a mixture of irrespirable gases with the mine air. Its composition is quite variable, the mixture consisting largely of carbon dioxide and nitrogen. It is the result of the combustion of carbonaceous matter in a supply of air sufficient to prevent the formation of carbon monoxide. The combustion of the carbon consumes the oxygen of the air to a greater or less extent, producing thereby an excess of nitrogen. The term "blackdamp" is sometimes wrongly applied to carbon dioxide (CO_2).

Ques.—Where does the blackdamp found in coal mines originate?

Ans.—Blackdamp is formed in abandoned workings that are poorly ventilated. It results from the slow combustion of fine coal and slack in the gob, by which is produced an atmosphere deficient in oxygen and containing a considerable proportion of carbon dioxide, together with an excess of nitrogen. Blackdamp may also result from an active mine fire, owing to the same causes.

It frequently happens that the evaporation of water in low wet places will produce considerable quantities of carbon dioxide that were contained in the water. This is particularly the case where the water has drained from the limestone formations and has taken up in solution the carbonate of calcium that constituted the limestone. The carbon dioxide given off in the evaporation of the water, in such cases, is not a product of combustion and there is no depletion of the oxygen in the mine air, although the results on life and flame are quite similar to those produced by true blackdamp. It is this condition that has given rise to the confusion of the terms "carbon dioxide" and "blackdamp," as now generally defined.

Ques.—What proportions of atmospheric air and light carbureted hydrogen are necessary to form an explosive mixture?

Ans.—Light carbureted hydrogen, or methane (marsh gas, CH_4), mixed with air, first becomes explosive when present to the extent of one volume of the gas to 13 volumes of pure air. This is called the "lower explosive limit" of the gas. The further addition of air increases the explosive violence of the mixture, which attains a maximum when the proportion of gas to air is 1 : 9.57. This is called the "maximum explosive point." A still further addition of gas causes a continued diminution of the explosive violence of the mixture, and explosion ceases when the proportion of gas to air is 1 : 5. This is called the "higher explosive limit."

A mixture of methane (CH_4) and air first becomes inflammable when the proportion of gas to air is 1 : 40. This is called the "lower inflammable limit" of the mixture, which continues to be inflammable as the quantity of gas is increased until the proportion of gas to air becomes 1 : 2.4, which is called the "higher inflammable limit."

All mixtures of methane and air between the lower and higher inflammable limits just mentioned are properly called "firedamp," because such mixtures will fire on the application of heat or flame of sufficient duration. It is wrong, however, to call pure methane or any mixture of methane and air outside of these limits "firedamp." This is a common error in many textbooks.

Ques.—How many cubic feet of air would be necessary to dilute and render harmless 500 cu.ft. of marsh gas?

Ans.—In order to render this volume of marsh gas noninflammable, it must be mixed with 40 times its volume of pure air. The volume of air thus required is $40 \times 500 = 20{,}000$ cu.ft. This mixture, however, would hardly be safe in mining practice, since it approaches too nearly to the point where the gas-charged air would inflame. To make a mixture of methane and air safe, the percentage of gas must be reduced to at least 2 per cent. under the best conditions in mining. This would require a volume of air and gas equal to $500 \div 0.02 = 25{,}000$ cu.ft., or the addition of 24,500 cu.ft. of air.

In a dry and dusty mine, where the coal is highly inflammable, safety is only reached when the percentage of gas is reduced to, say 0.9 per cent., which would make the volume of gas and air $500 \div 0.009 =$ say 55,500 cu.ft., or require the addition of 55,000 cu.ft. of air.

Ques.—What percentage of marsh gas in the air makes itself apparent in the safety lamp?

Ans.—The percentage of methane in the feed air that will produce the first indication of gas on the flame of a safety lamp will depend on the style of lamp used and the oil burned in the lamp. The favorite lamp with firebosses, for the detection of gas, is the unbonneted Davy lamp burning sperm or cottonseed oil. While some firebosses are able to detect the presence of gas when the air contains as low as 2 per cent., others can only detect with difficulty 2.5 per cent., and 3 per cent. of gas has, at times, escaped detection by firebosses.

A lamp burning volatile oil or hydrogen will give indications of the presence of gas in the mine air when a much lower percentage is present, but this type of lamp is not reliable as a means of making an accurate test of the percentage of gas present, owing to the effect of the volatile oil to increase the height of the flame cap.

Coal and Coke News

WASHINGTON, D. C.

Democratic leaders in Congress, urged by the Administration, are planning to enact new revenue legislation before Mar. 4 next. This provides chiefly for the imposition of a Federal surplus-profits tax. This statute, as tentatively drafted in the House would impose a Federal tax of 8 per cent. upon all profits of corporations and co-partnerships which are in excess of 8 per cent. of the capital of such corporations, etc. Profits of $5000 and less would be exempt from taxation.

The bill would define capital, upon which profits are estimated, as including capital stock actually paid in in money or property turned over to the use of the corporation, as well as surplus and undivided profits. Corporations and partnerships, however, which derive their income from agriculture or personal services, would not be taxed. In the latter class are grouped law firms, architects and other professional partnerships.

The Administration anticipates that this surplus-profits tax, which has been designed after the similar tax imposed by the European belligerents, will yield a revenue of over $214,000,000 annually. This additional revenue, it has been declared, is required to meet the extra expenses occasioned by the preparedness program inaugurated at the last session of Congress.

Fearing the defeat of his anti railroad-strike legislation, President Wilson, last week, visited the Capitol and conferred with a committee of the Senate. The President would not indicate whether or not the failure of this legislation at this session would result in the calling of a special session after Mar. 4 next, although this is being discussed as a possibility. The President is not unmindful of the fact that much of the opposition to the anti-strike legislation arises through the fact that it is feared by the legislators that it may next be extended to the coal mining and other industries in which the Federal mediation and arbitration law is now operating, as well as to the industry of interstate transportation.

By a vote of 7 to 3 the Senate Interstate Commerce Committee agreed to reject the principle of the Canadian disputes act, which is one of the important features the President desires in this legislation. This section of the measure would prevent a strike order going into effect until a Federal investigation had been made. It was reported that Senators Smith, of South Carolina, and Underwood voted with five republican members to defeat this section.

This legislation has been made the subject of hearings before the House Interstate and Foreign Commerce Committee, and it is the intention of the Wilson leaders to force action in the lower chamber at an early date. The President is hopeful that, regardless of how much the Senate may mutilate this legislation, it may be doctored into proper shape in conference.

An Important Order

An order in the car supply investigation has been entered by the Interstate Commerce Commission upon all interstate railroads directing them to modify radically their rules regarding the distribution of coal cars. The new rules will go into effect on Feb. 21, and continue in force until May 1 next. They relate exclusively to open-top coal and coke cars and to railroad-owned or controlled refrigerator, heater, ventilated and insulated cars. The Commission deferred action as regard the rules for the distribution of other classes of equipment, pending appointment by the executives of the railroads of a committee, vested with plenary powers, to cooperate with the Commission at Washington in securing a more equitable distribution of equipment.

The decision of the Commission was written by Commissioner McChord, whereas Commissioners Clark, Clements and Hall dissented from the opinion of the majority. Commissioner Clark, writing the dissenting opinion stated:

"The underlying idea is that open-top coal and coke cars and railroad-owned refrigerator, insulated, and ventilated cars shall be returned to their owners, while as to all other cars the American Railway Association rules are left to apply and ownership is disregarded. Were it not for the long-established custom, voluntarily agreed to among the railroads, under which all carriers members of the American Railway Association accepted the car service rules of that association and put their cars into service thereunder, there would be strength in the argument that the owner of the car is entitled to first claim on it. If as a matter of law carriers are required to promptly return to their owners coal and coke and refrigerator cars, I am unable to see why that some law would not extend to other kinds of cars.

The Commission is essentially an administrative body, exercising powers specifically delegated to it by the Congress. It also exercises quasi judicial powers, likewise delegated. But if the law is to be interpreted differently from time to time to fit conditions that obtain on the railroads, and the Commission exercises in a time of stress a power which it has not only never before felt that it had, but which it has several times said it did not have, it adds to its delegated and administrative and quasi judicial powers legislative powers, for the exercise of which I can find no justification."

The opinion of the majority of the Commission, however, condemned the practices of the railroads in the present emergency as regards the distribution of their cars, without mercy. It said:

"The present conditions of car distribution throughout the United States have no parallel in our history. In some territories the railroads have furnished but a small part of the cars necessary for the transportation of staple articles of commerce, such as coal, grain, lumber, fruits and vegetables. In consequence mills have shut down, prices have advanced, perishable articles of great value have been destroyed, and hundreds of carloads of food products have been delayed in reaching their natural markets. In other territories there have been so many cars on the lines of the carriers and in their terminals that transportation service has been thrown into unprecedented confusion, long delays in transit have been the rule rather than the exception, and the operation of established industrial activities has been made uncertain and difficult."

The Commission insisted that these conditions now urgently demand prompt, decisive action. It went on to explain:

"Cars received for a line-haul by foreign carriers were used for continuous local service on those lines and those received for switch movements received the same usage. These practices were frankly admitted by substantially all carriers, and while on behalf of some lines a desire to observe car service rules was expressed, it was stated that they could not do so unless other lines would also conform to those rules. The misuses of equipment resulted in depriving the owning lines of cars which they had provided for the transportation of coal, grain, perishable commodities, and other articles, in diverting such cars from the normal channels to the transportation of other commodities in other territories, in reducing in large measure the ability of certain carriers to serve the shippers and consignees of freight located on their lines and the lines of their connections, and in denying to many shippers and consignees such transportation facilities as were necessary to them and such as they would have received if freight cars had been handled in accordance with car service rules. Embargoes were placed by some lines against the movement of their own coal cars beyond their rails, for which they gave the explanation that such measures were necessary in order to retain on their own lines sufficient coal cars to serve the communities dependent on them for fuel."

The Commission thereupon cited the efforts of the so-called car service committee organized by the railroads. It was declared that the efforts of that committee to obtain the return of cars were without fruit. This committee, nevertheless petitioned the Commission not to enter any order until Mar. 1 next. The Commission insisted that delay until that date would permit the winter to go by without adequate relief from the intolerable conditions outlined.

"It is clear," said the decision of the Commission, "that the entry of a formal order is necessary to protect shippers, consignees, and the general public, but not less is it necessary to protect those carriers which have sent foreign cars home in obedience to the direction at the hearing but which have not received their own cars from other lines. It would indeed be an anomaly if certain carriers could with impunity violate section 1 by failure to observe reasonable rules for the 'exchange, interchange, and return of cars,' and by so doing prevent other carriers from furnishing the transportation upon reasonable request which is required by the same section. While all the members of the Commission are not in accord with respect to the powers of the Commission to make an order in this case, the wrongs are flagrant, and even if there were doubt as to the Commission's power to give full relief by formal order we think that in the emergency that doubt should be resolved in favor not only of the carriers who are wrongfully deprived of the use of their cars, but in favor of shippers and of the general public, who would be without adequate remedy if, having the power, we fail to act."

The rules prescribed by the Commission to become effective Feb. 21 next, follow:

"1. All foreign open-top coal and coke cars, and all foreign railroad-owned or controlled refrigerator, heater, ventilated, and insulated cars received under load may be forwarded to destination; when original lading is removed, or when received empty, they must be returned to their owners, either loaded or empty:

(a) Direct, if belonging to direct connections;

(b) Through the proper home route, if belonging to other than direct connections.

(Note.—The home road shall have the right to demand the return of its empty cars at the junction point where delivered loaded. This right does not apply to cars offered home for repairs under the provisions of M. C. B. Rule 2.)

2. The proper home route for cars belonging to other than direct connections includes the following deliveries only:

(a) Loaded, consigned (via any route) to a destination on the home road;

(b) Loaded, consigned (via any route) to a destination on a direct connection of the home road; or

(c) Loaded, consigned to a destination on the road from which originally received, if such movement is in the direction of home; or

(d) Empty, to the road and at the junction point from which originally received.

3. (a) Loaded cars may be delivered to switching roads to be unloaded within the switching district. Such deliveries shall be indicated on the junction report by the words "for unloading."

A car received loaded in switching service, when the original lading is removed, must be returned to the home road, loaded or empty, if a direct connection within that switching territory; otherwise, unless it home routes from the switching line to some other road, it must be returned to the delivering road, loaded or empty, in accordance with rules 1 and 2.

(b) An empty foreign car may be delivered to a connecting road to be loaded within the designated switching limits and returned. Such deliveries shall be indicated on the junction report by the words "for loading."

The road delivering the car to the switching road must in all cases specify loading, route, and destination, which must be in accordance with rules 1 and 2.

4. These rules do not apply to cars reconsigned with original lading under duly filed and published tariffs until the original lading has been removed therefrom.

5. Any delivery of a foreign open-top coal or coke car or railroad-owned or controlled refrigerator, heater, ventilated, or insulated car, except as provided in these rules, is a diversion."

Statistical Standardization a Problem

Standardization of mining statistics presents many knotty problems, according to members of the joint committee of the Bureau of Mines and the state mine inspectors who are considering the matter. A suggestion made by C. E. Lesher, the statistician of the Geological Survey, that the work of the committee be confined to coal mining, seems likely of adoption. Mr. Lesher points out that the greatest need for uniform statistics exists in coal mining and that the metal mining industry was not represented at the conference which authorized the appointment of the committee. Any effort to standardize the forms used in gathering metal mining statistics should not be undertaken without exhaustive consideration.

Director Smith of the Geological Survey objects to the suggestion that there be an unlimited interchange of information collected between government bureaus and state authorities. He is certain that producers, who are making individual returns to the Geological Survey would object to the distribution of these returns to any federal department or bureau or to any state government that might request the information.

Standardization of questions asked of operators is more to be desired, Mr. Lesher says, than the elimination of duplicate requests. "If inquiry blanks are standardized," declares Mr. Lesher, "the operator can keep his records so as to have immediately available the reply to the standardized questions. He can fill out two or three sets of the same questions without great inconvenience. As it is a large amount of extra clerical work is made necessary because each inquiry calls for figures in different forms yet each set of figures is purported to show the same thing."

Another of the problems suggested brings forth this note of caution from Mr. Lesher: "There appears to be no limit to which one statistically inclined may go in inventing refinements in the collection and compilation of information." He urges that sound judgment be used in the elimination of all possible questions so that the patience of the operators may not be taxed.

HARRISBURG, PENN.

The establishment and maintenance of proper relations between the carriers and the coal producing concerns of the Pittsburgh district, including the ascertainment of facts and the compilation and distribution of data and statistics relating to transportation charges from the several coal fields to the markets, is one of the fundamental reasons assigned for the organization recently of the Pittsburgh Coal Producers' Association. If the coal operators adhere to its stated objects the railroads will coöperate with the new assocation in the fullest measure.

It is declared by the association that it is essential that just freight rates from the several districts and equitable differentials shall be established and maintained as between competing coal-producing districts, but it is upon just those points that the railroads and coal producers are at issue and are likely to so continue.

The producers of the Pittsburgh district for years have complained of existing conditions as to freight rates on coal produced by them, and while they now make public profession of a desire that just and proper relations with the carriers shall be maintained at all times, it is the determination of the new association to force, if possible, a scale of transportation charges satisfactory to itself. Practically every coal operator in the Pittsburgh district, has joined the association, which has opened offices in Pittsburgh.

The association, it is said, is not organized for profit and although its revenues from assessments will be large they will be consumed by the heavy expenses of maintenance.

The promoters of the association disclaim any purpose to regulate prices, although members are obligated to file with the director all contracts entered into by them which shall be produced in the event of disputes. The director of the association is empowered to examine at will the books, records and documents of members who, in turn, shall supply him, upon request, with information regarding the financial standing of customers, together with their trade practices.

Hearing on Wagon Loading

More than 100 mine owners, representing every county in the bituminous region, gathered at Harrisburg on Jan. 18, to protest against a proposed change in Pennsylvania freight rates that would put the operators who load cars from wagons out of business.

Commissioner Rilling, of the Public Service Commission, held the hearing. The Pennsylvania Railroad's chief witness was Robert H. Large, coal and coke traffic manager. He said that the wagon loaders are men who usually supply the domestic trade, but who had started shipping coal simply because the price was abnormally high. They take the cars from the regular shippers, Large said. He also intimated that some of the operators who have tipples got their regular allotment of cars, then apply for more in the name of some employe, and load them with coal brought in wagons from tipples. These operators, it was asserted, are "putting one over on the company." Mr. Large stated that his company is considering distribution of cars on the basis of the yearly contracts which the various operators hold.

Shippers from Cambria, Beaver, Butler, Indiana, Westmoreland and Clearfield counties took the stand and said that they have contracts to fill; that they are regular operators the year round and that they will be put out of business if loading from wagons is prohibited. These operators argued that they have small mines that do not justify them in running tracks to the railroad and building costly tipples, but that they have as much right to sell coal as any one else. They charge that the big operators are trying to keep them out of the market in order to boost the price of coal.

They also contend that they load cars as quickly as the tipple-owning operators. These men also argued that they only received 2 per cent. of the cars distributed, and that the Pennsylvania R.R. has no grievance since the coal men never hold cars so long that they are assessed for demurrage.

One operator declared that he paid bonuses to his men in the dull season to have them on hand when the rush started, while another said he offered prizes of diamond pins to hold his crew together.

The large producing operators in discussing the shortage, contended that when the coal market is abnormally high, as at present, every farmer and land owner who has an outcropping of coal on his land digs coal and hauls it in wagons to the railroad siding. The big operators say the farmers load cars slowly and reduce the number of cars to be had for the faster-loading concerns. The larger operators point to the farmer coal diggers as one of the big causes of the coal car shortage.

PENNSYLVANIA

Anthracite

Minersville—Two miners were killed and one fatally injured recently from an explosion of gas at Phoenix Park colliery. The men walked into a pocket of gas without knowing their danger.

Plymouth—A lengthy conveyor line erected over the main street to the Nottingham No. 15 colliery of the Lehigh & Wilkes-Barre Coal Co., has been put into operation, hauling culm from the old bank to the Parrish washery half a mile distant. The removal of the bank means the displacement of an eyesore and will materially enhance the value of the property in the immediate neighborhood.

Scranton—The county commissioners of Lackawanna County are seriously considering the advisability of engaging a corps of engineers to make a survey of all of the coal in Lackawanna County. The commissioners are desirous of having this done as a matter of business principle to determine if figures submitted in the past by the coal companies for assessment purposes are accurate. Figures furnished the last few years show the assessments of the coal companies are decreasing each year at the rate of $2,000,000.

Morea—The Dodson Coal Co., at its collieries on the summit of Broad Mountain, has provided a skating pond for the people of that community, and in the summer will permit the use of the pond for a swimming pool.

Bernice—The O'Boyle-Foy Anthracite Coal Co., a short time ago transferred its mining rights in a 208-acre tract, in Sullivan county, to the Connell Anthracite Mining Co. The consideration for the leaseholding rights is a royalty on future mining. The tract secured from the O'Boyle-Foy interests will be tapped from the Connell mine and coal will be prepared in the Connell breaker. There are three coal beds under the tract. The surface is practically all scrub oak.

Pittston—Edwin C. Curtis, recently appointed mine inspector of the Ninth Anthracite district, addressed the meeting of the Pittston Mining Institute recently on the subject, "Safety First." The institute is having a successful season and the monthly meetings are largely attended. It is under the auspices of the Y. M. C. A., which also conducts classes in mining to prepare candidates for the state examinations for certification as mine foremen and assistant mine foremen.

Avoca—A serious mine fire is burning in the Checker vein in the Consolidated Mine of the Hillside Coal and Iron Co. near this place. Two years ago flames also broke out in the same workings. Hundreds of men have been put to work to fight the fire. In the previous one, the company had to build a wall half a mile long in order to prevent the flames from spreading to other parts of the mine.

Willkes-Barre—Rumors are again afloat that the Pennsylvania R.R. is negotiating for the sale of the Susquehanna Coal Co. It was announced several years ago that the railroad company would attempt the sale of this coal property as soon as a buyer could be found. The present rumor has the name of the Delaware & Hudson Co. as the purchaser. Some time ago it was reported that the Lehigh Coal and Navigation Co was considering the purchase of this property.

Bituminous

Connellsville—The production of the Connellsville and Lower Connellsville region for the week ending Jan. 13 was estimated at 333,192 tons, of which the merchant ovens produced 137,052 tons, a decrease of 1186 tons from the preceding week, and the furnace ovens made 215,140 tons, being a decrease of 4198 tons. Shipments for the week aggregated 10,039 cars, nearly 349,899 tons. This, together with 500 tons shipped down the Monongahela River by barge, made a total of over 350,000 tons.

Du Bois—An exposion and fire wrecked the power house of the Buffalo & Susquehanna Coal Co. on Jan. 17. The loss is estimated at $50,000. The explosion was said to have been oil in an air line. The accident put the mine pumps out of business, and considerable further damage will result from flooding of the operations. All the miners were gotten out of the mine before the hoisting machinery was put out of business by the fire.

Uniontown—The Ivy Ridge Coal and Mining Co. has leased and placed in operation the Rockwood mine at Rockwood, on the main line of the Baltimore & Ohio. This is a small operation with an output of possibly 300 tons per day.

Brownsville—The Hecla Coal and Coke Co. is the largest producer to return to the river in shipping coal to the Pittsburgh district. A permit was recently issued for a river tipple, ice breakers, and coal dock. About 10,000 cu.yd. of excavation will be made necessary for this tipple, a contract for which has been awarded.

Johnstown—A score or more of coal operators and others interested in first-aid work met on Jan. 16, at the Fort Stanwix Hotel, to discuss the matter of placing first-aid meets on a more systematic basis. At the meeting were representatives of the Federal Bureau of Mines and the Associated Insurance Companies. The conference was one of a series being held in various parts of the state. The object is to establish a uniform system of judging first-aid contests, and standards in compliance with the National Safety Association. One of the matters discussed was the refusal of the Red Cross Association to permit any but Red Cross physicians to adjudicate at the Red Cross first-aid meets.

Garrett—Coal trade developments which will make this town one of the most important mining centers in the Somerset region have just been launched. More than 1000 acres of land will be developed by five big corporations. Among these are the J. Blair Kennerly interests, Hinchman Bros., Romesburg Bros. and Goble Bros. Several thousand miners will be employed at Garrett within the next six months, it is estimated.

Husband—The Atlantic Coal Co., is planning to establish a modern coal mining plant, having purchased a large tract of land from the Lowery interests. The plant will be opened in the spring. It will be modern in every detail and will be operated on a large scale.

WEST VIRGINIA

Welch—Colonel and Mrs. William Leckie left here recently for Fireco to make preparations for shipping the first carload of coal from the Douglass coal operations. It has long been a custom with Colonel Leckie to have his wife decorate in national colors, state flags and bunting the first car of coal shipped from any one of his plants.

Ward—The electric power house and sub-station at mine No. 1 of the Kelly's Creek Colliery Co. was recently destroyed by fire, the origin of which was not known. While the actual property loss was only $2500, the fire will be expensive to the company, as operations at mine No. 1 will have to be suspended until the building can be replaced. The property loss was fully covered by insurance.

Elkins—John T. Davis is building the largest coal tipple in West Virginia at Grassy Run. One million dollars will be spent to build a town; 50 of the proposed 900 houses have been completed.

Bluefield—The Norfolk & Western Ry. lifted its embargo on coal shipments to connecting lines to the West on Jan. 18. The coal situation as reported by these roads was greatly improved over the conditions caused by the cold weather and snow of a short time before. For several days, bad weather in Ohio and surrounding sections is said to have impeded the movement of coal to Middle Western points to such an extent that a serious coal shortage was feared.

Charleston—Bills have been introduced into the West Virginia Legislature providing for the purchase, equipment, and operation of a mine-rescue car that would be stationed at Charleston ready for active and expeditious use in the event of mine disasters. This bill authorizes the Chief of the Department of Mines with the approval of the State Board of Control to purchase the car, and provides that it shall be fully equipped with life-saving apparatus and appliances suitable for use in case of mine disaster. The Chief of the Mining Department is also authorized to make necessary arrangements with the various railroad companies so that the car may reach the scene of any mine disaster with the utmost expedition. This car would also be used for training in rescue and first-aid work. The bill carries an appropriation of $35,000 to carry out the provisions of the act.

Earl Henry, chief of the Department of Mines, recently completed a tabulation showing where and when all the fatal mine accidents of 1916 occurred. The total number of miners killed was 375, of these 119 met death in McDowell County. The greatest number of fatal accidents occurred in July when 41 miners were killed while at work.

ALABAMA

Birmingham—The annual meeting of the Alabama Safety Association was held recently, and the following officers were elected for the ensuing year: James L. Davidson, president; J. B. McClary, first vice-president; S. L. Morrow, second vice-president; David Kelso, third vice-president; E. B. Sutton, secretary-treasurer, and John Vincent, assistant secretary. The personnel of the new executive committee is, W. S. Rountree, I. C. Deloney, F. G. Morris, Thomas Fear, C. H. Nesbitt and D. E. Morrow. Plans for the work of 1917 include a canvass for increase in membership, a periodical issuance of safety bulletins, and the holding of the largest and most interesting field meet in the history of the association. W. T. Burgess, of the local Federal Mine Rescue Station, is making a tour of the mining district and training teams in rescue work. There are now approximately 1000 first-aid men and 300 helmet men well trained in rescue work.

It is rumored that plans are again under way looking to the merging of properties of a number of independent coal operators. Two separate interests are understood to be at work for the consolidation of coal mining lands and plants, and the outcome of such negotiations will probably be made known in the early spring.

Regal—The Majestic Coal Co. has expended in the neighborhood of $75,000 on a new opening at Regal, in the northern part of Jefferson County, on the Louisville & Nashville R.R., from which coal is now being produced. Morris Bush, Birmingham, Ala., is president of the company.

KENTUCKY

Whitesburg—The County Board of Supervisors which has been in session here for two weeks has made large increases in the assessed valuation of properties of the big coal corporations of the county especially those of the Consolidation Coal Co., the Elk Horn Mining Corporation and others in the coal fields. These increases aggregate a total of several hundred thousand dollars.

Seco—The Central Safety Committee organized to prevent as far as possible accidents in the mines of the South East Coal Co. in its plants at Seco and La Viers held its first meeting in the office of the company recently. Frequent meetings are scheduled in which discussions will be made by authorities on how to prevent accidents in mines.

OHIO

Glouster—The Continental Mining Co. is preparing to open up Mine No. 17, at Hunterdon, as soon as the necessary work on the tipple and inside the mine can be completed. This it is estimated will take about two months. The mine has been idle for two years. It will employ about 350 men. The company will also start Mine No. 209, at Sugar Creek, as soon as possible.

Columbus—Effective Jan. 21, the Ohio Public Utilities Commission placed in force regulations providing for large increases in demurrage rates for the purpose of expediting the unloading of cars and relieving the present car shortage. There will be 48 hours' free time, after which demurrage rates will run $1 for the first day, $2 for the second day, $3 for the third and $5 for each day thereafter.

ILLINOIS

Herrin—The Watson Coal Co., operating a mine near Marion, has gone into a receivership with Walter Kriekhouse as receiver. The output of about 400 tons a day, it is understood, was contracted through Devoy & Kuhn of St. Louis at a low price, although at a price that ought to bring a legitimate profit. The receivership, it is claimed, cancelled the contracts. The company has had in the past considerable litigation in connection with its contracts.

Gillespie—The new coal mine to be opened here by the Superior Coal Co., is expected to be the largest in the state, if not in the world, with a capacity of 7500 tons and employing a force of from 1000 to 1200 men. A miners' hospital to cost $50,000 is also projected for this place.

Taylorville—The insurance companies have settled with the Springfield Coal Co. for the loss by fire of the Taylorville mine tipple recently by paying $2500.

Springfield—The Illinois Public Utilities Commission has issued an order providing for one reconsignment of coal shipments in transit. A $2 charge is imposed for reconsignment within 24 hours after a coal shipment reaches its destination and a $5 reconsignment charge thereafter. Railroad officials of all lines centering in Chicago agreed to give coal the preference over all commodities except perishable goods for 48 hours to avert a threatened fuel famine.

Representatives of 300 miners employed at the Devereaux mine of the Chicago & Springfield Coal Co. have filed a petition with the public utilities commission against the Springfield Consolidated Railway Co. and the Illinois Traction Co. for improved service on the trolley line which runs to the Devereaux mine.

Bloomington—Mines in Central Illinois, mining officials say, are producing more coal this winter than at any time in a decade. If it was not for car shortage, it is said, there would not be a miner in this part of the state out of a job. Unusual demand for manufactured commodities is the reason assigned. Many of the shafts being worked vigorously had been closed down three or four years and were only reopened last fall. Mining men do not anticipate that there will be any further increase in price except possibly for brief intervals under stress of extreme weather conditions. The car situation is improved. Eighty-five per cent. of the Central Illinois miners have had employment since early in November. Nearly 75 per cent. have put in full time. New men are being taken on every day.

Foreign News

Peace River, Alta.—Two coal mines in this neighborhood are being opened. One of these is situated on the Heart River about two miles from the town of Peace River. The coal which is reported to be of a good grade is expected to be immediately put on the market. The other mine is six miles down the Peace River and the coal is said to be of fine quality

Personals

Fred M. Sackett, of Louisville, one of the prominent Kentucky coal operators, has just been elected president of the Louisville Board of Trade.

Samuel M. McMahon, who has been mine inspector of the Fifth District of West Virginia, has resigned his position to accept that of assistant general manager of the Jamison Coal and Coke Co. mines at Fairmont, W. Va.

J. M. Haddick, for a number of years superintendent of the Portage operations of the Portage Coal Co., has been transferred to Clymer, Indiana County, Penn., where he will be in charge of the interests of the same company.

H. D. Savage, vice-president of the American Arch Co., in addition to his present duties, has been appointed manager of sales of the industrial department of the Locomotive Pulverized Fuel Co., with office at 30 Church St., New York City.

Joseph L. Jacoby has been appointed superintendent of the Consolidation Coal Co.'s retail plant at Portsmouth, N. H., taking active charge Feb. 1. Mr. Jacoby resigned as superintendent of the Philadelphia & Reading Co.'s plant at Newburyport, Mass., that office having been closed Jan. 1.

Harry R. Reed, who has been chief of the office force of the Brothers Valley Coal Co., at MacDonaldtown, Penn., has been made superintendent, succeeding C. R. Roy. James Taylor of this company will assume the mine foremanship, while Patrick Purcell, a foreman, has resigned.

H. L. Laird, Secretary of the Northwestern Traffic and Service Bureau, Inc., of Minneapolis, Minn., will be the guest of honor and principal speaker at the annual banquet of the St. Louis Coal Club, to be given Wednesday evening, Jan. 31, at the American Annex. His subject will be "Trade Organization."

Heber Groff, formerly of Ashland, Penn., but more recently attached to the Mahonoy City engineering corps of the Philadelphia & Reading Coal and Iron Co., has accepted the position of superintendent of the Colbert Colliery of the Cambridge Coal Co., and will enter upon the duties of his new position at once.

Martin F. McDermott, of Pittsburgh, has taken quarters in the Union Central Building, Cincinnati, Ohio, as western sales manager for the Amherst Fuel Co., of Huntington, W. Va., Mr. McDermott was formerly with the executive departments of the Semet-Solvay Co., the Four States Coal and Coke Co., and others.

F. N. Hammond, recently branch manager of the Goodyear Tire and Rubber Co., at Youngstown, Ohio, has been made branch manager at Cleveland, succeeding R. S. Hartzell, who has been placed in charge of manufacturers' business in Cleveland and vicinity, under the jurisdiction of the Detroit district office. Mr. Hartzell's headquarters will continue at Cleveland.

H. W. Burson, who organized the Colonial Supply Co., recently sold his interest in that company and has organized a new concern under the name Burson Supply Co., with offices in the Arrott Building, Pittsburgh. Mr. Burson is president and the other officers and directors are well known business men, located in the Pittsburgh district. The new company will handle a full line of mine and mill supplies.

Obituary

Thomas J. Mayo, father of the late John C. C. Mayo, died recently at the age of 76 years after a long illness of Bright's disease.

David J. Llewellyn, prominent coal operator of Johnstown, Penn., died suddenly recently at his residence, 411 Grove Ave., "Moxham," death being due to apoplexy. Mr. Llewellyn had been ill of grip for several days, but was recovering. He was the owner of much coal land near Johnstown and controlled property involved in the famous suit against the Sunnyside Coal Co., one of the longest drawn legal battles in the history of Cambria County. Mr. Llewellyn was born in Wales 72 years ago. His wife and 7 children survive him.

Industrial News

Louisville, Ky.—Traffic on the Ohio River has been practically suspended as a result of much ice.

Ashland, Ky.—The Crofut-Wells Coal, Oil and Gas Co. has been organized with a capital stock of $50,000. The incorporators are H. E. Wells, A. H. Crofut and W. F. Wells.

Louisville, Ky.—The Greasy Fork Coal and Timber Co., of Louisville, Robert G. Gordon, treasurer, is publishing notice of dissolution for the purpose of terminating its existence.

Hazard, Ky.—The Kentucky-Jewel Coal Co. has decreased its capital stock from $50,000 to $45,000, although the company will make some increases in its plant during the coming year.

Alton, Ill—All traffic on the Chicago & Alton R.R. was sidetracked on Jan. 19 in the vicinity of Alton while a train load of coal was rushed into the city to keep factories in fuel.

Rayland, Ohio—B. W. Lewis and others have purchased 1600 acres of coal for stripping purposes, lying between the Wabash and Panhandle railroads. Two shovels have also been acquired.

Alton, W. Va.—The Hays Coal Co. has been organized with a capital stock of $5000. The incorporators are A. J. Tenny, J. M. Swick, T. A. Tenny, C. H. Cutright, and Hugh Benson, all of Alton.

Uniontown, Penn.—The Faith Coal Co. has been organized with a capital of $5000. The incorporators are A. J. Lewis, W. J. Kearns, J. C. Cramer, of Uniontown, and William Ball, of Isabelle.

Bellaire, Ohio—The Hanover Coal Co. of Bellaire has been organized with $225,000 capital stock. The incorporators are C. A. McFadden, C. M. Wyrick, A. C. Beetham, M. L. Blackburn, and O. G. Beans.

Hamilton, Ohio—The Sloat-Darragh Coal Co. has been chartered with a capital of $25,000. The incorporators are F. J. J. Sloat, C. E. Darragh, Mathilda B. Sloat, O. V. Parrish and Herbert E. Bender.

Philadelphia, Penn.—The W. H. Bradford Co., a coal brokerage firm of this city, has leased the Brandonburg mines in the vicinity of Rockwood, Penn. These operations comprise about 1100 acres of land.

Pocahontas, Va.—The Annan Pocahontas Coal Co. has been incorporated with a maximum capital of $25,000. The officers are C. S. Minter, president, E. V. Garrett, secretary and treasurer, both of Pocahontas.

Blanche, Ky.—The Chappell Coal Co. with a capital of $15,000 has been organized by W. M. Chappell, J. S. Chappell and R. J. Galloway. The new company will start a development on the Chappell coal lands.

Smithfield, Ohio—Papers have been filed with the secretary of state increasing the authorized capital of the Beluan Coal Co. from $150,000 to $300,000. It is one of the newer producing concerns in Belmont County.

Johnstown, Penn.—The annual meeting of stockholders of the Grazier Coal Mining Co. scheduled for Monday, Jan. 22, in Johnstown, has been postponed indefinitely on account of the absence of some of the officers.

New York, N. Y.—Ophuls, Hill & McCreery have been incorporated as consulting engineers with offices at 112-114 West 42d St., New York City. The firm consists of Fred Ophuls, Halbert P. Hill and J. Harold McCreery.

Canton, Ohio—The Canton Coal Co. has been incorporated with a capital of $20,000, to mine and sell coal. The incorporators are D. P. Loomis, F. C. Loomis, W. G. Broseman, W. N. McDonald, and C. A. McDonald.

Whitesburg, Ky.—Eastern coal operators are making leases on the J. P. Lewis and J. N. Thompson coal land tracts on "Sandlick" near here, and it is said will install uptodate mining plants within the next few months.

Sommerset, Penn.—D. B. Zimmerman, president of the Quemahoning Coal Co., has purchased the right of Isaiah Good in a coal property they had acquired as partners, nearly 1000 acres being conveyed to Mr. Zimmerman.

Whitesburg, Ky.—Oscar W. Brock and associates, of Barbourville, Ky., purchased the plant of the Fern Hill Coal Co. in the western Kentucky field a few days ago and will improve and remodel the plant during the present year.

Uniontown, Penn.—The Producers Coke Co. during the past year exceeded its previous year's business by $2,000,000. This is far in excess of the last year, and believed to be the best year financially in the history of the company.

Wheeling, W. Va.—The Pittsburgh-Wheeling Coal Co. was recently incorporated with a capital stock of $100,000. The incorporators are J. D. Reich, E. K. Arendts, J. G. Sharp, J. V. Reyburn, and M. Lytle, all of Parkersburg, W. Va.

Ages, Ky.—The East Harlan Coal Co. has increased its capital stock from $60,000 to $75,000 having purchased additional properties, and will open new developments during the present year. Increases in its old plant at Ages will also be made.

Norton, Va.—It is said here that the Virginia Iron Coal and Coke Co. will begin a million-dollar coal-mining plant on the headwaters of Guests' River—the Black Mountain section—the initial work to be started within the next few weeks.

Harlan, Ky.—The Catron's Creek Coal Co. which recently increased its capital from $25,000 to $40,000, announces increases in its plant which will practically double the output of 2000 tons daily. The addition of new properties will also be made.

Troy, Ohio—Miami Valley Coal Co., Covington, has been formed. D. G. Wenrick, Covington,

president; S. J. Rudy, Covington, vice-president; S. S. Miller, Covington, secretary-treasurer. This company has purchased 4500 acres in Monroe County, Ohio.

Elkhorn City, Ky. (Praise P. O.)—The Elkhorn City Coal Co. is being organized by J. K. Elswick and others with a capital stock of $50,000 for the purpose of making developments of the old Elswick coal land tract. Development work is to start at once.

Krypton, Ky.—The Mowbray-Robinson Co. announces the early building of a 10-mi. branch coal and lumber road from the main line of the Louisville & Nashville at Krypton. The survey was made some time ago, and a contract will soon be let for its construction.

Flemington, W. Va.—The White Horse Coal Co., of Flemington, has been organized with an authorized capital of $10,000. The incorporators are W. T. Gates, W. J. Roderick, Victoria Gates, W. A. Sherwood, of Flemington, and F. T. Martin, of Grafton, W. Va.

Montgomery, W. Va.—The Eagle Coal Co., to operate in Fayette County, was recently incorporated with a capital stock of $10,000. The incorporators are Matthew Buster, Arch McKinney, Patty Buster, Lea McKinney, and Charles Lemmons, all of Montgomery.

Wellsburg, W. Va.—The work of completing the new coke plant for the La Belle Iron Works is being pushed, and it is expected that the plant will be started within a short time. It is anticipated that the first coke will be drawn from the ovens about Feb. 1.

Huntington, W. Va.—The Monte Mining Co. has been organized with an authorized capital of $10,000 and chief works at Ottawa, in Boone County. The incorporators are Paul Hardy, C. M. Gohen, H. C. Aleshire, Thomas W. Hardy and R. D. Aleshire, all of Huntington.

Duhring, W. Va.—The Norfolk & Western Railway Co. is preparing to secure additional yard space for handling loads and empties on its Widemouth division. It has selected a site near Duhring, and is to commence work at an early date preparing the ground for tracts.

Logan, W. Va.—The Logan-Eagle Mining Co., with chief works in Logan County, has been organized with a capital stock of $35,000. The incorporators are O. J. Deegens, A. M. McConnaughey, F. H. Adams, and E. H. Butts, of Logan, and S. E. Scholl, of Accoville.

Charleston, W. Va.—With an authorized capital of $25,000 the Thurston Land Co. has been incorporated for the purpose of dealing in coal and other lands. The incorporators are C. P. Myer, M. W. Myer, John W. Moore, H. H. Young, and George F. Skidmore, all of Charleston.

Nanticoke, Penn.—Fingers were appraised at a valuation of more than $1000 each by a jury in court on Jan. 18, when a verdict of $3264 was returned in favor of George Allen, who sued the Delaware, Lackawanna & Western R.R. Co., for the loss of three of these members in a mine accident.

Huntington, W. Va.—The Black Diamond Fuel Co. was recently issued a charter. It will operate in Logan County. The authorized capital is $25,000, and the incorporators are S. A. Draper, S. E. Robertson, C. N. Davis, and D. W. Brown, all of Huntington, and Naaman Jackson, of Logan.

Connellsville, Penn.—The Tropf Coal Co. of Connellsville, with chief works in Monongalia County has been organized with an authorized capital of $200,000. The incorporators are Fred Tropf and Margaret Tropf of Everson, Penn., A. S. Stickel, Sarah E. Stickel, and R. S. Matthews, of Connellsville.

Williamson, W. Va.—A charter has been issued to the Garb Coal Co. with chief works near Sprigg in Mingo County. The authorized capital is $10,000 and the incorporators are A. G. Rutherford of Thacker, C. M. Gates of Sprigg, J. K. Anderson of Charleston, G. R. C. Wiles and B. R. Bits of Williamson.

Charleston, W. Va.—It is reported that a reorganization of the Coal & Coke Railroad Co. is being formulated. It is said that additional motive power and rolling stock will be purchased at once. It is also reported that the Baltimore & Ohio, which contemplated purchasing this road, has abandoned the deal.

Washington, Penn.—D. W. Braznell recently purchased a 100-acre coal tract from the Crawford heirs. Plans have been made for the immediate development of this field, the operating company being known as the Glen Coal Works. The output when 200 men are employed will be 1500 tons of coal daily.

Jefferson City, Mo.—The Phillips Workmen's Compensation bill has been introduced in the Missouri Legislature. A conference committee representing employers has drafted a substitute bill. Members of organized labor are divided in regard to it, some holding that it is too indefinite and others favoring it.

Charleston, W. Va.—The Big Creek Coal Co., of Detroit, Mich., has been organized with chief works in the Harts Creek district of Lincoln County, W. Va. The authorized capital is $100,000, and the incorporators are Matthew Slush, W. E. Metzer, J. P. Cummiskey, Carl E. Eseery, and John B. Hamblen, all of Detroit, Mich.

Birmingham, Ala.—The Anchor Coal Co. has been organized in Walker County and will open a mine near Dora. W. A. Lewis, of Dora is president, and headquarters are at Jasper. The company will open an office in Birmingham. It will construct 2 mi. of spur track. Four hundred acres of good coal lands have been acquired at this point.

Whitesburg, Ky.—The Whitesburg Coal & Timber Co. has been organizel with L. F. Jackson, president; W. W. Sergent, vice-president; S. E. Baker, secretary-treasurer. The new company has a capital of $50,000. It will develop coal properties adjacent to this city on the Lexington & Eastern branch of the Louisville & Nashville R.R.

South Fork, Penn.—The Wilmore-Basin Smokeless Coal Co. is soon to apply for a state charter and will begin developing a big tract of land in Cambria County. Plans for the new operation have just been completed. The plant will be reached by a branch road to be built from the main line of the Baltimore & Ohio's Somerset & Cambria branch.

Claghorn, Penn.—A contract has been awarded for the erection of 30 new dwellings for the Vinton Colliery Co. in Indiana County. Work on these houses will begin at once. The colliery company is driving three new drifts and establishing extensive operations. It is expected that a score or more additional houses will be erected next spring.

Baltimore, Md.—The Simpson Coal Co. of Baltimore has been organized with an authorized capital of $3,000,000 to operate in Taylor and Barbour counties of West Virginia. The incorporators are J. W. Galloway of New York, David Williams of Wendell, W. Va., George Paul of Pittsburgh, Penn. J. E. McGowen of New York and John T. Manson of New Haven, Conn.

Canton, Ohio—The Berger Manufacturing Co. has a new trade mark which will be used in all the publicity of this concern in the future. The matter received a great deal of consideration and it was finally decided to offer a prize for the design selected for the trade mark. The contest closed recently and M. A. Goodwin, a Chicago artist, was the winner, submitting the design chosen.

Austin, Tex—Bills are pending in both house and senate of the legislature prohibiting railroads or other common carriers from confiscating coal or other commodities delivered to them for transportation. The bills meet with favor and the passage of one is assured. They were called forth by the recent acute coal shortage which was aggravated by the action of the railroads in confiscating coal on their lines.

Austin, Tex.—State Purchasing Agent George Leavy has filed complaint before the Texas Railroad Commission against the Missouri, Kansas & Texas Railway Co., alleging that it confiscated a carload of coal purchased by the state and consigned to the tuberculosis sanatorium at Carlsbad. The commission ordered an investigation to see if its order to railroads to cease confiscating coal on their lines had been disobeyed.

Louisville, Ky.—The superintendent of the Illinois Central R.R. here announces that a locating party under the supervision of A. B. Harris, of Chicago, has begun final survey of the new proposed railroad line connecting Dawson Springs and Providence, a distance of 22 mi., and traversing one of the richest coal and timber belts of this district. The line will be for freight traffic only, and will open up thousands of acres of fine bituminous coal lands.

Pittsburgh, Penn.—The George T. Ladd Co. has changed the name of the water-tube boiler which it manufactures from the Milne to the Ladd. Since the purchase of the Milne patents some years ago, further developments have been prosecuted along original lines to such an extent that the majority of the patents now being utilized have been taken out by Mr. Ladd. The firm consequently believed that it was warranted in making this change of name.

Modoc, W. Va.—The Turkey Gap Coal and Coke Co. recently moved into its new store. The new tipple will be in operation about Feb. 1. Several new houses yet remain to be built, but when these are completed it is anticipated that this firm will have one of the prettiest little plants in the field. The same firm is developing another mine at Ennis, W. Va., and when this is in operation it will be classed among the largest operators in the state.

Harrisburg, Penn.—Soft coal operators in the Clearfield, Cambria, Indiana and Westmoreland districts recently appeared before the Public Service Commission to protest against the plan of the Pennsylvania R.R. Co. to increase its rate where coal is loaded into cars from wagons instead of from tipples. The small operators contended that they can load a car from wagons in one day, and that where tipples are employed the work is not done faster.

Chicago, Ill.—The annual convention of the sales and factory organizations of the Chicago Pneumatic Tool Co., was held at the Great Northern Hotel recently. The program included a trip to the company's plant at Chicago Heights concluding with a banquet at the Great Northern. Dec. 31 closed the biggest month and the biggest year in the history of the Chicago Pneumatic Tool Co. About 100 of the company's branch managers and representatives were in attendance.

Huntington, W. Va.—An extremely large coal car passed through Huntington recently over the Baltimore & Ohio to the Chesapeake & Ohio, and consigned to the Virginian at Deepwater. This car was built at Johnstown, Penn., by the Pressed-Steel Car Co. It is of all steel construction, 50 ft. in length, and weighs 83,300 lb., having a capacity of 218,000 lb. or 109 tons. The car is to be used by the Virginian, and if the experiment proves successful others of this size and pattern will be built.

Boston, Mass.—The Consolidation Coal Co., of Baltimore, has purchased the controlling interest in the Coastwise Transportation Co., the largest shipping concern in this city. The eight large steamers of the Coastwise Transportation Co., and one more under construction and nearly completed, will be used exclusively in transporting the coal of the Consolidation Coal Co., both in the foreign trade and coastwise. The price paid was $200 per share, par value $50. The management of the company will remain in Boston.

Chicago, Ill.—The Inland Steel Co. at Indiana Harbor, Ind., has just placed in operation a battery of 44 Koppers byproduct coke ovens. This completes the third order given by the Inland Steel Co. to H. Koppers Co. for coke ovens. The plant now consists of 130 Koppers ovens with complete byproduct and benzol recovery plants. H. Koppers Co. has completed 805 byproduct coke ovens in the past 12 mo. These ovens have a total coal carbonizing capacity of approximately 5,000,000 net tons of coal per year.

Connellsville, Penn.—Property of the Indian Head Coal Mining Co. on the Indian Creek Valley R.R. is to be developed under a new ownership and management. A new tipple is to be erected, a second mine opening provided, new boilers installed and the whole operation to be made over on modern lines. Langdon Lea, Cyrus D. Tatman and John M. Gates, all associated with J. Tatnall Lea & Co., of Philadelphia, are applicants for a charter for the Oneida Coal Mining Co. S. R. Goldsmith, of Connellsville, has conducted the legal affairs

Pittsburgh, Penn.—The United Coal Corporation of Pittsburgh has placed with the General Electric Co. an order for nine 150-kw. motor-generator sets, together with the necessary switchboards, and a number of large alternating-current motors. Three of the motor-generator sets will be installed at each of the three mines, Ella, Patterson and Rich Hill. These will be changed over from power made at individual plants to purchased power from the West Penn Electric Co. The installation will be completed during the coming summer.

St. Louis, Mo.—On account of the extraordinary conditions existing in many cities in this part of the country, the coal operators of the Middle West may decide that it is not good policy in the future to make any contracts for domestic coal, only to such steam users as give a bona-fide guarantee that their coal will be used for steam purposes in their own plants exclusively. Several communities are almost out of coal because a small dealer has a contract with a shipper that enables him to get a small quantity and he keeps the price so low that the other dealers can not compete when buying coal on the open market. This has caused much trouble and is one of the reasons that so many towns are out of fuel.

St. Louis, Mo.—The Municipal Bridge between St. Louis and East St. Louis was opened to the public on Jan. 20 by Mayor Kiel, assisted by the civic organizations of the two cities. The first load of merchandise of any kind to go over the bridge was a load of coal from East St. Louis to St. Louis. This is the first time coal has escaped the bridge toll between the two cities in years. The last time it happened was several years ago when the river was frozen over and coal was hauled on the ice. Several of the large retail coal companies are arranging to unload their fuel in East St. Louis and bring it over by motor during the night for the big steam plants in St. Louis. This is necessitated by a new ordinance which the city anticipates enacting, compelling the coal trade to deliver steam coal in the downtown districts at night only.

Columbus, Ohio—Orders were issued recently by M. S. Connors, general manager of the Hocking Valley, that no cars of that company should be loaded with coal for shipment to Toledo for transfer there to the Pere Marquette, Michigan Central, Shore Line or the Ann Arbor, until the present congestion on those four lines is relieved. The Hocking Valley has 1200 cars of coal in the Parsons Ave. yards at Columbus and 1400 cars in the Walbridge yards at Toledo, the bulk of which is for the four connecting lines. Under normal conditions the Hocking Valley has been turning over to these four roads from 450 to 500 cars of coal daily, but the bad weather during the past few days has made it impossible for these lines to handle that much, especially as the Pennsylvania, Wheeling & Lake Erie, Ohio Central and Cincinnati, Hamilton & Dayton have been turning heavy tonnages over to the same lines at Toledo every day.

Market Department

GENERAL REVIEW

Anthracite demand less urgent though still very firm. Railroad embargoes create a spotty condition in the bituminous trade. High level on contract prices. Acute shortage at the Lake cities. Conditions much improved in the Middle West.

Anthracite—The situation is slightly easier under the influence of the very erratic weather conditions and slightly better shipments, combined with the feeling that the end of the winter is at least in sight. However, the improvement is of modest proportions, the market being far from easy. The big companies continue hopelessly behind on orders and there has been some fresh demand appearing from consumers who accumulate heavy reserves in the summer months which have now been exhausted. With the big surpluses of the large companies now cleaned up and the market dependent entirely on current production, the situation still has grave possibilities. There is less urgency in the demand, and premium offers are not so large or frequent, though a few instances have appeared this week where commission houses have endeavored to buy coal in transit to retail dealers. Dealers find it difficult to realize a profit on premium coal and certainly will not purchase anything beyond their absolute requirements.

Bituminous—Local embargoes at various points have upset the trade and created a decidedly spotty condition by diverting excessive tonnages to districts open to shipment, and cutting off the movement entirely to other sections. This together with a somewhat better car supply in the mining regions has had a depressing influence on quotations though the general average for the week shows a slight increase due to firmer conditions in the Pittsburgh district. Receipts are notably better at Hampton Roads, and the vessel delays there have been largely eliminated. A significant development recently come to light is the fact that certain banking houses are exerting pressure on some producers to obtain supplies for operations in which they are interested. April contracts are hanging fire due to both sellers and buyers hesitating about committing themselves, but considerable business coming up at the first of the year has been closed at good advances especially on foreign business and bunker supplies. The Pennsylvania shippers are in an especially difficult position due to the uncertainty in the labor conditions prevailing there.

Ohio Valley—The Pittsburgh district demand is even heavier, with prices up still higher, and it is obvious that the market could absorb more coal than is being received without weakening quotations. Drastic railroad embargoes have developed a very serious situation at some points, where a closing down of industrial operations is eminent, unless conditions improve very soon. The situation is particularly acute at the lake cities. Many consumers are sending representatives into the mining regions to check up shipments on their contracts, and also to pick up any free tonnages available. Transportation difficulties are increasing, the past week having witnessed substantially the worst conditions of the season. Confiscation of considerable tonnages for the railroads has accentuated the shortage. Pittsburgh district contracts for the year beginning Apr. 1 are firm on the basis of $3.50 for ¾ in. gas coal, and it is understood that this figure will also apply on practically all grades and sizes. Consuming interests are taking the initiative in negotiations.

Middle West—The spectacular conditions that developed in the Chicago market a week ago, resulting in drastic action being taken to relieve the shortage, have given way to a more normal situation. Some very heavy shipments have been made as a result of which dealers have been able to accumulate some small reserves. There is much less anxiety, but with weather conditions vacillating to both extremes and the liability of heavy storms at any time, there is still much uncertainty as to the future. Conditions in the Northwest are particularly acute, a number of industrial plants having been forced to close down already because of the inadequate supplies. Anthracite supplies on the docks at Chicago have been exhausted for some time, and, with embargoes against rail shipments, the situation is serious on this grade.

A Year Ago—Short car supply restricts anthracite production, while demand increases at a spectacular rate. Bituminous situation fairly well in hand, though occasional large premiums are paid. Exports make another big gain. Interior markets greatly disturbed. The Middle West continues very active.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Year Ago	Jan. 27	Jan. 20	Jan. 13	Jan. 6	Dec 30
Clearfields	*$2.50@2.75	$4.75@5.60	$4.75@5.60	$4.75@5.60	$4.75@5.60	$4.75@5.75
Cambrias and Somersets	2.75@3.10	5.00@6.25	5.00@5.65	5.00@6.00	5.00@6.00	5.25@6.25
Pocah. and New River[1]	2.80@2.90	6.50@7.00	6.50@7.00	6.75@7.25	7.00@7.50	7.25@8.00
Philadelphia						
Georges Creek	3.10@3.25	6.00@6.25	6.00@6.50	6.50@6.75	6.50@6.75	6.00@6.25
W. Va. Freeport	2.45@2.50	5.00@5.25	5.25@5.50	5.75@6.00	5.75@6.00	5.00@5.25
Fairmont Gas mine-run	†2.15@2.20	5.25@5.50	5.25@5.50	5.50@5.75	5.75@6.00	5.25@5.50
Pittsburgh (steam coal)[2]						
Mine-run	†1.50@1.75	4.50@4.75	4.25@4.50	4.00@4.25	5.00@5.25	4.25@4.50
¾-in.	†1.60@1.85	4.50@4.75	4.25@4.50	4.00@4.25	5.00@5.25	4.25@4.50
Slack	1.35@1.60	4.00@4.00	3.75@4.00	3.85@4.00	4.95@5.05	3.50@3.75
Chicago (Williamson and Franklin Co.)[2]						
Lump	†1.65@1.75	3.75@4.00	3.50@4.00	3.75@4.00	4.00@4.50	3.75@4.50
Mine-run	1.10@1.15	3.25@3.50	3.00@3.50	3.50@3.75	4.00@4.25	3.75@4.00
Screenings	†.95@1.10	3.25@3.50	3.00@3.50	3.50@3.75	4.00@4.25	3.75@4.00
Gross average[3]	*$1.99@2.16	$4.64@5.03	$4.54@4.98	$4.74@5.11	$5.16@5.53	$4.73@5.19

[1] F.o.b. Norfolk and Newport News. [2] Per net ton. [3] The highest average price made last year was $4.80@5.33 made on Nov. 25.

* Price lower than the week before. † Price higher than the previous week.

BUSINESS OPINIONS

Iron Age—After all the peace moves, it is apparent that American steel manufacturers will be beset for months with more business, export and domestic, than they can handle. The past week has emphasized the tightening of the situation. Predictions lately made of a lessened export movement in 1917 are to be taken in the light of larger expectations of an expanding domestic demand which the mills cannot put aside. More has come out concerning shell steel bought for the Allies for the second half. Four companies took on large amounts, and the buyers want much more, which at present the mills could not safely agree to deliver. Canada in particular is now trying to buy such steel.

Dry Goods Economist—Buyers for representative jobbing houses throughout the county were in the New York market this week attracted by the convention of the National Wholesale Dry Goods Association and its subsidiary organizations. Retail concerns in all sections are also well represented here. Altogether, the movement of merchandise has been of good proportions, and considerable progress has been made in the introduction of new lines for spring and for next fall.

Bradstreet—Business is good for the season, with less peace talk there is more confidence as to near-future purchases and sales, the country's leading industries are sold far ahead, retail trade in heavy goods has been accelerated by cold weather, and traveling salesmen are meeting with success in booking new orders. Conservatism is of course evident, reckless buying is not in vogue, and domestic demand for steel has slowed down, but it is evident that supplies of essential staple articles are not excessive. Prices, with few exceptions, continue to swing upward, this exerting a conservative influence upon buying.

Dun—Irregular tendencies again appear in trade and industry, with business rising in some channels and falling in others, and with wholesome conservatism still the outstanding and most reassuring feature. With the requirements of many large concerns covered far ahead, the necessity of urgent purchasing is obviously less apparent and signs multiply of the restricting influence of high prices, some interests holding off because of the knowledge that reaction is inevitable, though as yet there is little evidence of yielding. Commercial failures this week are 358, against 359 last week, 312 the preceding week and 462 the corresponding week last year.

Marshall Field & Co.—Current wholesale shipments of dry goods show substantial gains over the corresponding period of a year ago. The total volume of road sales is running well ahead of the same week 1916. Merchants have visited the market in larger numbers.

American Wool and Cotton Reporter—Activity in noils, particularly French combed noils, still prevails. One sale of a large quantity of washed fleece, Ohio and Pennsylvania, at 50c., was made during the week. Shipping facilities are growing more difficult, and this does not tend to lower prices. The fact that the British Government has fixed prices for wool is causing a feeling here that it will have a bearish effect on the price.

Contract Prices

Boston—One of the largest distributors at this place is closing contracts for the year from Apr. 1 at $7 on cars, which is 25c. less than what was understood the season's rate would be. None of the other shippers are reported canvassing for business, and it is understood that at least one big shipper will charter its steamers in the export trade in order to take advantage of the prevailing high freights. Some of the Pennsylvania agencies have become so alarmed over the constantly increasing unrest in labor circles that they have withdrawn contract figures announced a month ago.

New York—On a small contract involving 4000 tons, operating interests offered to close at $5.85 per ton as compared with $3.90 on the old contract, giving the buyers the refusal of the offer for 24 hr. The contract was not closed, though it is understood some of a like nature were signed.

Philadelphia—Since the contract figure of $3.50 for high-grade coals was announced, there has been considerable activity among producers of lower-grade coals to close, and some business has been covered. Indications are that most of the contract business will carry over to the usual time, a week or two previous to Apr. 1, while there is considerable inquiry from consuming interests.

Hampton Roads—Foreign contracts expiring the first of the year are being renewed on the basis of $4.75 and bunker contracts at $5 plus trimming. On contracts expiring Apr. 1 there is very little heard, neither buyers or sellers appearing anxious to close.

Pittsburgh—Consumers are showing more interest in contracts, while operators are holding off or limiting the tonnages for which they will commit themselves. Recent reports of contracts for the year beginning Apr. 1 for ¾-in. gas coal being closed at $3.50 have been confirmed and it is stated that this figure will apply equally on all grades and sizes. This compares with a price of $2.75 for contracts closed for the year beginning Dec. 1, and with a circular price of $1.50 named on contracts for the year beginning last April, which price was also frequently shaded as much as 15c. or more.

Columbus—Prices are still unsettled but the prevailing figure appears to be $2.50 for mine-run. The contracts entered into so far are principally with old customers and have been based largely on past business. Word comes from certain districts in Pennsylvania that contracts for mine-run have been made as high as $3.50 for the better grades of Pennsylvania coal. One large producer in Virginia contracted for a considerable tonnage in the East at $2.25. Lake shippers are trying to get contracts but so far little business has been closed. One shipper is said to have contracted for approximately 500,000 tons from eastern Ohio at the average figures prevailing at the opening of navigation.

Atlantic Seaboard

BOSTON

Contract prices apparently well understood. Spot prices a shade easier, but sales still light. Georges Creek hardly heard from. Pennsylvania operators withdraw prices in many cases. Retail dealers do business on very small stocks of anthracite.

Bituminous—A large distributor from Mystic Wharf inland has closed some contracts at $7 on cars from Apr. 1 to Apr. 1 which is 25c. less than what was understood would be the program, and most consumers are taking this as an indication of lower prices later. None of the other shippers or distributors so far are canvassing for contracts. Most of them have said they were not yet in position to name prices. At least one shipper has let it be understood that they may prefer to charter their steamers in the export trade and get the high prevailing freights, allowing rehandling plants to be idle until things in the coastwise trade get normal again. The contracts closed thus far are those of consumers who depend upon just the one distributor.

Meanwhile, the shippers are trying to make as good a showing as possible on contracts that expire Apr. 1. Receipts here are only moderate, but practically all the Hampton Roads agencies are managing to keep their customers supplied.

More than a few consumers who have asked for contract prices are meeting with no response, this applying to inland tonnages as well as to requirements directly at Tidewater. The various distributors are watching each other very closely, but the fact that the business must be confined to those who control steamers gives the seller an easier feeling than he has enjoyed for some years.

Spot prices show a modifying tendency, receipts at the piers having improved slightly. Detention is less and spot demand is therefore less insistent. Export and bunker inquiry continue strong and dumpings of that description still take a large share of the coal available, coastwise shipments being fitted in as conditions permit.

Spot cargoes of Pocahontas and New River at this end are a rarity. Lately a quotation of $9.25 alongside was made, corresponding with the $9.50@9.75 price being quoted on cars Boston for small lots.

Slow movement of boats has been the rule the past fortnight. This has kept many consumers on the ragged edge, so much so that several have had to resort to emergency shipments by rail from nearby points.

Georges Creek cargoes are few and far between. The light receipts are being applied to contract business, but the shippers are still far behind on deliveries due.

Many of the Pennsylvania operators are trying to adjust wages on a basis that will keep miners at work and if possible increase their output. Several interests who are alarmed over the labor prospect have withdrawn the season prices they were making a month ago and have about decided to suspend all sales for the present. Car-supply is improving in most parts of the region, and the great difficulty now is the shortage of men. The situation is so acute in some of the districts that mines ordinarily getting out 3000 to 4000 tons daily are down to less than 1000. All kinds of inducements are being made the men to continue at work, but the outlook is not encouraging.

Several shippers are far behind on their contract obligations, but are none the less being constantly importuned to take on new business. Banking houses are even bringing pressure to bear on operators to furnish coal to plants in which they are interested. The situation is decidedly complicated, and it is difficult to see any let-up for months to come. The all-rail market on the lower grades, however, is somewhat easier.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. and Somerset
Philadelphia	$5.90@6.75	$6.25@6.75
New York	6.10@7.00	6.55@7.10
Tidewater mines	4.75@5.60	5.00@6.25
Alongside Boston (water coal)	8.25@8.50	8.35@8.75

Pocahontas and New River are quoted at $6.50@7 f.o.b. Norfolk and Newport News, Va., for spot coal, and $9.50@9.75 on cars Boston and Providence for inland delivery.

Anthracite—The weather has again set back the movement of barges, and shipments are very irregular. Broken and pea are the sizes in shortest supply at the piers. Loading does not improve. The railroads, at New York especially, are congested with general traffic and the movement of coal to Tidewater is extremely slow.

With the advance of the season the retailers here show an increasing tendency not to buy premium coal. Present quotations on the latter are at a figure that leaves no margin at all for the distributor, and unless they can keep going on company deliveries several of the dealers are about resolved to suspend.

PHILADELPHIA

Anthracite eases slightly, but still short and market depends on weather. Inquiries continue. All sizes in strong demand, especially stove and pea though few premium offers. Bituminous steam coals drop slightly. Gas coal firm. Transportation conditions unsatisfactory. Little tide trade.

Anthracite—There has been an easier market throughout the trade. Demand is still very active, but there is not the panicky feeling that existed during December. The orders on the books of the big companies remain hopelessly in arrears, yet the smaller operators report less activity in bidding for their free coal.

The retailers are busy but are not swamped with business and are hiring fewer outside teams. Hauling conditions have been ideal since the first of the year, though a storm the first day of this week somewhat retarded deliveries and brought many new orders. These were mostly from the class who fill their bins during the spring and early summer, and who refuse to be put off with a ton or two. It is this business that the retailers have been dreading, as they are not able to take care of the larger business until shipments are made in greater volume.

Many retailers are taking advantage of the present conditions to place their business on as nearly a cash basis as possible. It has always been the custom to carry a large amount of money on the books from late spring until the opening of the coal season again in the fall. This is the trade that never pays for its coal until it orders a few more tons and as a consequence is never out of the retail man's debt. It is known that some dealers are already arranging to dispense with this trade entirely if they cannot be convinced of the justness of the retailers' stand.

As already stated stove size continues extremely short and still leads in demand. This week quite a number of complaints have been heard that this size was running too large and the dealers have intimated that the shipping companies are allowing an excess of egg in the coal. This may be possible, but on the other hand we know of a few dealers who are mixing a few hundred pounds of egg with each ton of stove, in order to make the latter go as far as possible. The call for egg continues and the suburban dealers who are the largest buyers are in dangerously short supply. Another plan by which the dealers have endeavored to relieve the shortage of stove size is by asking their customers to take a half each of egg and chestnut mixed. Chestnut is not plentiful but it is now the least troublesome size.

Pea continues active and dealers who a month ago were satisfied with their stocks of this grade are now clamoring for more. Each cold wave brings a rush of small buyers for this size and it is not uncommon for a dealer to deliver practically nothing else for a day or two at a time. Small dealers who could not store any quantity of it when it was being freely shipped are now out and those who had a large supply are becoming alarmed.

Not much premium coal is being offered on this market, although there are still some sales being made. An unusual situation in this connection is that commission houses are offering to buy cars of coal in transit to the retail men paying a slight premium for them though not many sales of this kind have been made and these are mostly for trans-shipment to other markets or perhaps for local sale to some one in very urgent need of a particular size.

Steam coal continues in very strong demand. Of course buckwheat is the shortest and while sales of free coal have been made here recently at $3.75 even this price of late fails to bring out the coal, and it is understood that in outside markets $5 is being freely paid. The other sizes are also well taken, with very little free tonnage. Prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken	$3.60	$4.65	Buck	$2.00	$2.90
Egg	4.15	5.25	Rice	1.25	2.15
Stove	4.10	5.60	Boiler	1.10	2.00
Nut	4.50	5.55	Barley	1.00	1.90
Pea	2.80	3.70			

Bituminous—Prices shaded off again this week on the principal steam grades, although the gas coals held fairly firm. The change in quotations ranged from 25c. to 50c.

The chief element in this softening has been the numerous embargoes placed by the railroads. The Baltimore & Ohio, for instance, has placed restrictions against all shipments destined to the Philadelphia & Reading via the Western Maryland and Cumberland Valley, and also against several of the tidewater shipping points on the coast north of here. In addition the delivery roads within the city have at times had in effect numerous local embargoes. As a consequence there have not been many places to which shipments could be made.

It is felt, however, if the true conditions were thoroughly understood, there would certainly be no falling off in prices, as the car supply at the mines is reported particularly inadequate this week. Just as it was understood that the labor difficulties in the western mines had been settled, a number of companies with selling agencies located here report their mines once more idle on account of strikes.

Local consumers seem to be fairly well supplied, and are apparently only buying for current needs. There is bound to be a more spirited demand for coal soon, and with no prospect that the production will be in any way adequate to meet it.

The principal interest in contracts still continues to be manifested by the consumer. Ever since the contract price of $3.50 was announced for the very best grades there has been much activity on the part of the shippers of the ordinary grades to place their tonnage at this figure, and they have been successful in closing some business. Nevertheless we feel certain that nearly all concerns will hold off most of their contract business to within a week or two of Apr. 1, the usual contract season here.

Shipments over the piers destined to foreign ports have not been very heavy, although inquiries continue to reach the shippers quite freely. Ocean freights have stiffened so much that the business is almost at a standstill and this condition has been further accentuated by the sinking of a large number of freighters by the German raider.

The movement has been much below the average recently and it is felt that a heavy snowstorm would seriously impede transportation.

The prices per gross ton f.o.b. cars at mines are as follows:

Georges Creek Big Vein	$6.00@6.25
South Fork Miller Vein	5.75@6.00
Clearfield (ordinary)	5.25@5.50
Somerset (ordinary)	5.25@5.50
West Va. Freeport	5.00@5.25
Fairmont gas, lump	5.50@5.75
Fairmont gas, mine-run	5.25@5.50
Fairmont gas, slack	4.50@4.75
Fairmont lump, ordinary	5.00@5.25
Fairmont mine-run	4.75@5.00
Fairmont slack	4.50@4.75

NEW YORK

Anthracite situation easier. Domestic grades more plentiful and prices lower. Buyers holding back. Good demand for bituminous with contract coals moving freely and spot tonnages scarce. Car supply better.

Anthracite—Conditions are easier in the anthracite market. Demand is slow and with more of the domestic sizes on hand prices are lower. This does not indicate, however, that retail dealers are buying more coal. There is less anxiety regarding future supplies and a feeling of certainty that it will be possible to obtain all the coal necessary. Buyers are backward about paying current prices for the individual product.

Dealers who predicted the present easiness are now making further predictions that almost normal conditions will prevail within the next few weeks.

Buying is better in the New England States and the chief question involved is that of delivery. The railroads are practically free from embargoes, but water shipments are slow owing to the scarcity of bottoms and slow loading at the docks.

There is a fair supply of chestnut coal at Tidewater but egg and stove continue scarce. As a rule if a buyer takes a mixed cargo, quotations are 25c. less on chestnut than for the other large coals. There is a good inquiry for pea coal, but the supply is limited. The steam coals are active; quotations are high but there is a strong demand and very little spot coal to be had.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$4.95	.....
Egg	5.45	$7.25@7.75
Stove	5.70	7.25@7.75
Nut	5.75	7.00@7.50
Pea	4.00	6.75@7.00
Buck	2.75	6.00@6.25
Rice	2.20	4.50@5.25
Barley	1.95	3.50@4.00
Boiler	2.20	.....

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—The bituminous market lost more of its edge this week. More coal has come to the New York Tidewater but there is little free tonnage to be had. Contract users are getting better supplies but are far from being satisfied yet.

Car supply in the Somerset regions shows a pronounced improvement, some operators saying it is better than it has been in months. Labor supply continues short and there is some pretty labor troubles about.

Contracting is slow. While some good sized tonnages have been closed at good prices most consumers are holding back for lower rates.

Bunker deliveries are better but some vessels have been delayed because of the non-delivery of fuel.

Loading is better at Tidewater but shippers complain of the slow arrival of cars. There is some embargo orders, but these are confined to

individual shippers. Loaded boats are in good demand and prices are a trifle stronger than for f.o.b. coal.

New England is taking considerable coal from this port and there is a brisk demand for bottoms, but water rates are stiff.

Local demand is slow, most dealers doing a hand-to-mouth business and a reaction is looked for with lower prices. Line trade is fair but prices are easier.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	Port Reading	South Amboy	Mine Price
George Crk. Big Vein	$7.25@7.50	$7.25@7.50	$5.25@6.00
Tyson	6.75@7.00	6.75@7.00	4.50@5.25
Clearfield	6.75@7.00	6.75@7.00	4.50@5.25
South Frk	6.75@7.00	6.75@7.00	4.50@5.25
Nanty Glo	6.75@7.00	6.75@7.00	4.50@5.75
Som'r. Co	6.75@7.00	6.75@7.00	4.50@5.25
Que'ho'ing	6.75@7.00	6.75@7.00	4.50@5.15
W. V. Fa'rm't Th'r'qua	6.75@7.00	6.75@7.00	4.25@5.00
Mine-run	6.75@7.00	6.75@7.00	4.25@5.00
West. Md	6.75@7.00	6.75@7.00	4.50@5.25

BALTIMORE

Embargoes cause break in the soft coal market, as mines must deliver in restricted territory. Anthracite business brisk and deliveries poor. Export movement continues light.

Bituminous—Under the influence of rail embargoes against so many points that both Baltimore & Ohio and Western Maryland operators were unable to ship points off the originating lines, the market here broke sharply the early part of the present week. Prices slumped over Sunday, but on Monday, there was improved purchasing due apparently to the lower prices for spot coals, and the market remained firm at the new figures. A further recession is not looked for and the trade expects to see another tightening move develop as soon as the embargo situation improves. It was the stoppage of shipments via the P. & R. and the embargoing of St. Georges, combined with embargoes by the L. & N. and other roads to the congested rail centers of the West, that caused operators to offer coal much below the figures of a week ago.

Gas and steam coal both went off in the movement. Offerings to the trade had a rather wide range at the mines, but prices averaged about as follows per gross ton: Georges Creek Tyson, $5; Quemahoning, $4.75; South Fork, $4.50; Somerset, $4 to $4.50; Clearfield, $4 to $4.50; Freeport, $4; Fairmont gas, ¾, $3.50 to $4; same, run-of-mine and slack, $3.50.

Anthracite—A healthy demand for hard coal has been maintained over the rapid temperature changes. Shipments are still slow, and nearly every dealer is short on some particular size.

Export—There is little excitement along export lines. Inability to secure bottoms for foreign coal movement has held up many shipments. During the past week the movement totaled 12,416 tons. The B. & O. will open its big new export pier here immediately. Its new type of belting system was given a successful tryout on two Baker-Whiteley Coal Co. barges last week.

HAMPTON ROADS

Some improvements in car supply with delays not over two or three days. Export contracts being renewed in satisfactory number.

While there is undoubtedly considerable improvement in receipts from the mines, the supply of cars is far from normal. On one day last week the supply in the Pocahontas Field was only 22% and a few days like this offset the better supply of several days. Shippers are hoping the recent ruling of the Interstate Commerce Commission regarding the return of cars to their owners will bring the desired relief, though the order will not become effective for thirty days yet.

Now that receipts are somewhat better delays to vessels are not so serious, most shippers being able to load them in from two to three days. There are no stocks at Hampton Roads and it seems an impossibility to accumulate any. Contracts for foreign shipment, which expired Dec. 31, are being renewed on the basis of $4.75 for the standard grades of Pocahontas and New River. It is rather early yet to report any progress in regard to contracts expiring Apr. 1, as there does not seem to be any desire to hurry matters. Bunker suppliers have received a large number of contracts from foreign steamship owners on the basis of $5 plus trimming. This price is in line with the price of $4 in the Gulf for an inferior grade of coal and a short ton.

Prices are fluctuating around $7@7.50 for Pocahontas and New River for coastwise shipment and export, $6.50@7 for local delivery on tracks and bunker coal $7.50 plus trimming.

Dumpings at the Hampton Roads piers for the past several weeks were as follows:

	Dec. 29	Jan. 5	Jan. 13	Jan. 20
Nor. & West	101,202	110,673	111,316	137,103
Ches. & Ohio	38,234	78,839	118,613	103,335
Virginian	98,200	46,220	69,372	85,661
Total	237,636	235,732	299,301	326,099

Ocean Shipping

VESSEL CLEARANCES

The following vessels have cleared with coal cargoes:

NORFOLK

Vessel	Destination	Tons
Giovanni G[1]	Italy—Any port	4,547
Achilles[6]	Cristobal, C. Z.	12,018
Kronborg[2]	St. Lucia, B. W. I.	5,253
D'Aosta[1]	Bagnoli, Italy	3,976
Clio[1]	Plombino, Italy	2,948
Kish[3]	Antofagasta, Chile	6,878
Isis[3]	Curacao, D.W.I.	1,133
New Orleans[5]	Kingston, Jamaica	1,104
Bella[7]	Kingston, Jamaica	745
Graafaxe[8]	Havana, Cuba	1,823
August[9]	Buenos Aires, A. R.	7,383
Malm[3]	Kingston, Jamaica	1,715
Fjell[3]	Manzanillo, Cuba	925
Rebecca R. Douglass[1]	St. Georges, Bermuda	481
Grand Turk[4]	Point a Pitre, Guadalupe	744
Wethersfield[1]	Vera Cruz, Mexico	2,386
Orgeonian[1]	Rio de Janeiro	7,275
Normanton[1]	Genoa, Italy	1,384
Mathilda[1]	Rio de Janeiro	6,094
Volturno[1]	Porto Ferrajo, Italy	11,027
Skulda[4]	Santiago, Cuba	1,567
Amelia[1]	St. Georges, Bermuda	1,003
Stephen[12]	Para, Brazil	1,915
Rimfaxe[7]	Kingston, Jamaica	1,137
Hulda Maersk[9]	Santiago, Cuba	1,877
Wellington[13]	Dakar, F. W. A.	8,190
Ulysses[3]	Cristobal, C. Z.	12,035

NEWPORT NEWS

Jos. J. Cuneo[3]	St. Georges, Bermuda	748
Johan Mjelde[10]	St. Lucia, B.W.I.	2,522
Moldegaard[2]	Antilla, Cuba	4,059
Brighton[9]	Santiago, Cuba	934
Wascana[2]	Rio de Janeiro	7,210
Guardia Nacional[3]	Buenos Aires, A. R.	3,297
Camilla May Page[11]	Salt River, Jamaica	1,060
Pathfinder[2]	Ponce, P. R.	1,789
Helvetia[5]	Christianstad, D.W.I.	626
Olga[2]	Cayo Francis, Cuba	1,040
George S. Smith[2]	Georgetown, Demerara	796
Atlanten[14]	Buenos Aires, A. R.	2,212
Lovland[2]	Rio de Janeiro	3,089
Sioux[2]	Havana, Cuba	2,312
Skogstad[2]	Havana, Cuba	5,480
Peter H. Crowell	Bridgetown, Barbados	3,985
Margarcia[2]	Cayo Francis, Cuba	2,013
Edwin R. Hunt[13]	Cette, France	1,485
Elder Branch[15]	Iquique, Chile	2,380
Elder Branch[15]	Antofagasta, Chile	3,807
Doris[13]	Italy—Any port	5,182
Mary F. Barrett[4]	Port of Spain	2,642
Ozama[2]	Havana, Cuba	2,400
Ocland[2]	Havana, Cuba	4,600

PHILADELPHIA

Gov. Powers	Bahia	1,579
Cogne	Azores	
Ulrik Holm	Havana	930
Van Hogendorp[2]	Havana	2,009
Wien	Jucaro	
Sheba	Halifax, N. S.	
Heina	Antilla	
Durley	St. Johns	
Tallac[2]	Laguna del Carmen*	

[1] Pocahontas Fuel Co. [2] Berwind-White Co. [3] Castner Curran & Bullit. [4] Baker-Whiteley Co. [5] Smokeless Fuel Co. [6] Crozer Pocohantas Co. [7] Hasler Bros. [8] New River Coal Co. [9] C. G. Blake Co. [10] C. & O. Coal Agency Co. [11] West Virginia Coal Co. [12] C. & O. Coal & Coke Co. [13] C. H. Sprague & Son. [14] Matlack Coal & Iron Co. [15] Island Creek Coal Sales Co.

* Via Vera Cruz.

COASTWISE FREIGHTS

Rates from Hampton Roads to Boston are unchanged, $3 being quoted as the present market. No season charters are as yet heard. The supply of barges is short, and few charters of any kind coastwise are reported.

Freights from New York to Long Island Sound ports are nominally at $1.15@1.20, but with very few takers. Delays in loading are so much the rule that charterers are shy of getting involved in heavy demurrage charges.

PANAMA CANAL

Fuel movement through the canal for the two weeks ended Jan. 5 was as follows:

Vessel	From	To	Tons
Ilford	Newport News	Iquique	[1]5,240
Ocean Monarch	Newport News	Mejillones	6,170
Minnesotan	Newport News	Honolulu	7,789

[1] Coal and coke.

OCEAN FREIGHTS

There was only one reported fixture for export coal since last report, a boat of 6000 tons, 10%, for February or March loading, Virginia to Rio, at or about $17.75 net. The freight market continues to advance, principally due to the great scarcity of available tonnage, and it is becoming more and more difficult each day to arrange export coal charters, although occasionally we have boats willing to accept less than market rates to certain destinations owing to special reasons.

We would quote freight rates on coal by steamer as follows:

	Jan. 15	Jan. 22
West Coast Italy	$48.00 about	$48.00 about
Marseilles	46.80 about	46.80 about
Barcelona*[2]	28.80@31.20	28.80@31.20
Montevideo	22.80@24.00	21.60@22.80
Buenos Aires	22.80@24.00	21.60@22.80
Rosario	24.00@26.40	24.00@25.20
Rio Janeiro	[3]17.00@18.00	[3]18.00 about
Santos	[3]18.00@19.00	[3]19.50 about
Chile (good port)	12.00@14.00	12.00@14.00
Havana	4.25@4.50	4.25@4.50
Cardenas, Sagua	6.00 about	6.00 about
Cienfuegos	6.00@6.50	6.75 about
Port au Spain	9.00 about	9.00@10.00
St. Lucia	9.00 about	9.00@10.00
St. Thomas	8.00 about	8.00 about
Barbados	9.00 about	9.10 about
Kingston	7.00 about	7.00 about
Curacao[1]	7.50 about	7.50 about
Santiago	6.50 about	6.75@7.00
Guantanamo	6.50 about	6.75@7.00
Bermuda	6.00 about	6.00 about
Vera Cruz	8.00@9.00	9.00@10.00
Tampico	8.00@9.00	9.00@10.00

* Spanish dues for account of cargo. [1] And p.c. [2] Or other good Spanish port. [3] Net.

Note—Charters for Italy. France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

W. W. Battie & Co.'s Coal Trade Freight Report

Exporters shipping to the allied nations are greatly concerned at the destruction of ships by the German raider and submarines. It is reported that the transportation problems of the entente countries has become so acute that even the fixing of maximum rates on coal transportation has failed to relieve the coal shortage in France and Italy due to the fact that neutral vessels are refusing to carry coal from British ports to the allied countries because neutral ports offer better rates. This condition is plainly reflected in the number of clearances from this country, more than the usual number of vessels sailing for South American ports.

OCEAN CHARTERS

Coal charters have been reported as follows during the past week:

PHILADELPHIA

Vessel	Destination	Tons	Rate
Van Hogendorp	Havana	2,006	
Ulrik Holm	Havana	930	
Gov. Powers	Bahia	1,579	
Tifton	Para	479	
Bellhouse	Buenos Aires	2,177	$17.00
Novo	Buenos Aires	1,411	17.00

BALTIMORE

Ryvarden	Guantanamo	646
Clara Randall	Christiansand	

NEWPORT NEWS

Ocland	Havana	1,874

ATLANTIC RANGE

Rhine	River Plata
Timandra	River Plata

BIDS FOR NAVY COAL

Telegraphic bids will be received by the Navy Department until noon, Feb. 2, for either transportation of coal or coal and trasportation, for delivery at the Navy Yard, Boston, Mass. Bidders should state the name of the mines from which the coal offered originates, also the name of the company from which purchased. Coal to be Navy Standard and subject to rejection if not satisfactory. The quantity required is about 10,000 tons and daily discharge rate of 500 tons at Boston is guaranteed.

Ohio Valley

PITTSBURGH

Spot market somewhat higher again. More interest in contract coal. Prices may be $3@3.50.

The spot market is up an average of about 25c. in the week, thus continuing the rise noted a week ago. Car supplies are very unsatisfactory, but a fairly large tonnage is being moved. A curious feature of the situation is the fairly large supply of box cars, which do the coal trade no good.

Demand for coal is even heavier than it was and it is evident that very much larger supplies could be offered without the spot market declining much. The present market, indeed, suffers greatly from embargoes and if these were lifted the outlets for coal would be much larger.

More interest is being shown in the matter of contracts for the twelvemonth beginning Apr. 1. Consumers are enquiring about prices and are evidently anxious to get under cover. The operators represent that they would have preferred to defer the contracting for a month or more but in the circumstances are forced to

name prices or get the reputation of not being willing to sell.

It appears that most of the business will be done by way of renewing old contracts, between the same buyers and sellers. Operators, however, represent that they are not in position to sell as much coal as a year ago. In the past two or three months they could excuse short deliveries on contracts on the ground that cars were scarce, something not contemplated when the contracts were made, but that any contract made now would be with full knowledge of the car shortage, so that there would be no excuse and hence the only ecurse is to sell less coal.

Recent reports are confirmed that in some instances coal for the twelvemonth beginning Apr. 1 has gone at $3.50 per net ton. While this seems to have been ¾-in. gas coal operators state that there is not likely to be much difference between steam and gas, or between slack, mine-run and screened. As long ago as last November a contract was made for the twelvemonth beginning Dec. 1 at $2.75 and this price is now regarded by operators as altogether too low.

It is stated that not all the contracts made a year ago will expire Mar. 31, as some of them were made for two years, sellers then quoting the same price for two years as for one. What proportion of the business was done for two years is not known.

We quote spot coal at $4@4.50 for steam and gas slack respectively, $4.50@4.75 for steam mine-run and $5@5.50 for ¾-in. gas. We quote contract coal for the twelvemonth beginning Apr. 1 at $3@3.50, all per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous prices sagging, despite continued reports of car shortage. Only a few contracts being made and it is difficult to fix prices. Anthracite plentiful here, but scarce in Canada.

Bituminous—The trade is not so active. Buyers are noting the weakness of prices and are trying to hold off, though it is not easy to do so, as the car supply is about at its worst. With embargoes in every direction the car that arrives promptly is the exception.

Much attention is given now to the contracting and some effort is being made to do business in that line, but as a rule both buyer and seller are holding off. It is hard to settle on a price and the conviction is so common that further fluctuations are sure to take place that a good many operators and jobbers declare that they will not contract at all. Not a few of them have had great difficulty with existing contracts and are eager to be free of them. Jobbers usually insist on a $3 contract price for all Pittsburgh and No. 8 coal, while the consumers seldom offer more than $2.50.

The car situation is said by railroad men to be improved, but shippers do not acknowledge it and say that the weaker prices are mostly due to lighter demand. Quotations are made as follows, per net ton, f.o.b. Buffalo:

Youghiogheny Gas	$6.25@6.75
Pittsburgh Steam	6.00@6.50
Ohio No. 8	6.00@6.50
Allegheny Valley	5.75@6.25
Pennsylvania Smokeless	5.90@6.40
Cambria Co. Smithing	5.95@6.45
All Slack	5.85@6.35
Cannel	5.90@6.40

Anthracite—The Buffalo situation continues easy. Trestle owners report that they have seldom run out of coal lately and are giving consumers all they want. Following the slight advance made by certain wholesalers to adjust their prices with those of others who put their prices up a few cents, the city retailers have made a similar advance, bringing their prices to consumers up to $7.70 for egg, $8 for stove, $8 for chestnut, $7.40 for grate, $6.65 for pea, $5.35 for buckwheat, $8 for cannel, $8 for select lump and $8.50 for smithing, per net ton at the door with extra charge for putting in.

TOLEDO

Situation worse due to railroad embargoes. Northern roads unable ot take care of shipments.

The coal situation has been somewhat worse in the past week than for some time. There are embargoes on most of the West Virginia roads and the New York Central has also placed embargoes on Toledo coal shipments for transfer to four connecting lines though this will be modified as soon as the car congestion is relieved. The Hocking Valley has 1400 cars in Toledo and 1200 in the Columbus yards, loaded with coal, said to be for delivery to the Pere Marquette, Michigan Central, Lake Shore and Ann Arbor at Toledo. The order does not affect the coal destined for public institutions or public utilities, or shipments for transfer here to railroads other than the four designated. The northern lines are all in bad shape and seem to be extremely short of equipment and unable to handle their business. The supplies in Toledo during the past week have been much lower than usual and there is threatened shortage all along the line, including manufacturing institutions.

TORONTO, CAN.

Shortage of bituminous still pronounced. Severe weather delays transportation. Railways confiscate shipments. Advance in anthracite prices.

The shortage of soft coal is still seriously felt and prices continue high. Supplies come forward slowly railroad traffic having been considerably interfered with by severe weather and snow falls. A good deal of coal in transit has been confiscated by the railways.

The price of nut and stove anthracite coal has been advanced 50c. per ton on account of increased price at the mines. Quotations for best grade per short ton are as follows: Retail anthracite egg, $9; stove and nut, $9.50; grate, $8.75; pea, $8; bituminous steam, $15; slack, $14; domestic lump, $10; cannel, $10. Wholesale f.o.b. cars at destination bituminous three-quarter lump, $9; slack, $10.

DETROIT

Practically a complete freight embargo is raised against Detroit, coal by way of Toledo excepted. Little coal on tracks. Lake rate unsettled.

Bituminous—On Jan. 20 the railroads announced a general embargo against Detroit though the order was later modified to permit shipments of coal and food by way of Toledo. More than 7000 cars of coal consigned to Detroit are reported held in Toledo. It is believed the suspension of other freight shipments will facilitate movement of these cars to destination.

While most Detroit factories have a supply of raw material on hand it is feared some plants may be forced to close if the embargo remains long. Their closing would to some extent lessen demand for steam coal. There is a very apparent scarcity of coal in Detroit and reports indicate that some towns in the interior of the state are practically without coal. Mine quotations range from $5 to $5.50 for any size of bituminous at the mines.

Anthracite—Only small quantities of anthracite are coming to Detroit though most of the retailers have been able so far to provide a limited amount to customers in actual need of coal. Domestic consumers, in many cases, are paying $10 a ton for anthracite.

Lake Trade—Owners of Lake freighters are showing no haste to close coal carrying contracts for the 1917 navigation season. Offers from shippers of cargoes to be moved to docks at the head of Lake Superior at a rate of 40c. seem to arouse little interest.

COLUMBUS

Car shortage and congestion has reduced production to a low ebb. Demand for both domestic and steam grades continues good. Prices firm.

The heavy snow of last week was bad for the railroads and as a result the car supply has been exceedingly short. It has been the worst week during the present car stringency and generally speaking the output has been reduced to 25 to 30% of normal. This is expected to result in short stocks although retailers so far have been able to care for their orders.

The domestic trade has been rather active, stimulated by the colder weather and snow. Dealers have been busy making deliveries as household stocks are generally short. Pocahontas and other fancy grades are in good demand at high prices and all grades are quoted at about the same figure. For the time being at least dealers' stocks are sufficient for current needs and there are no indications of an immediate shortage.

Requisitions on the part of large steam users are large and the consumption is heavier than for some time. Quite a few cases of fuel shortage are reported from certain sections of the state and unless the situation is relieved there will be considerable suffering. Embargoes on many roads at Toledo and Detroit has congested the Hocking Valley. The T. & O. C. is also short of cars and the same is true of the B. & O., the Wheeling and Lake Erie and other roads entering the coal fields.

Prices on short tons, f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4.75	$5.00	.....
Inch and a quarter	4.75	5.00	$4.75
Three-quarter inch	4.75	5.00	4.75
Nut	4.50	5.00	4.75
Egg	4.50	4.50	.....
Mine run	4.50	4.50	4.75
Nut, pea and slack	4.25	4.50	4.75
Coarse slack	4.25	4.50	4.75

CINCINNATI

Continued severe weather keeps up the domestic demand. Car situation not improved. Steam grades scarce and strong.

Continued cold weather, with heavy snow, has resulted in the demand becoming even more insistent. The call for fuel for industrial use also remains strong, making the market as a whole high and active. The difficulty in getting enough cars remains a factor and with heavy snow on the tracks, the transportation situation shows little prospects of improving. Prices remain very high for all grades, with a rising tendency. Contracting has not progressed very far as yet, owing to the reluctance of both sides to sign up.

LOUISVILLE

Short car supply, unsatisfactory output and slow movement are advancing market and adding premiums to coal on track. Retail situation disquieting.

A heavy snow all over Kentucky, coupled with a short car supply, has slowed up the whole trade. Southeastern Kentucky had a forty per cent. supply of cars on L. & N. lines during the week and the difficulties resulting from the weather have reduced the output of the mines and retarded the whole movement. Coal on the track is commanding premiums everywhere. Industrial plants in numbers of cases where dependent on this market are being compelled to shut down while utilities in the Middle West are sending representatives to the mines to pick up odd lots of fuel and to watch contract shipments.

Western Kentucky is reporting a lessened car supply and similar operating difficulties due to the weather. Retail supplies all over the section are very low and dealers a week or more behind on deliveries. In some towns city administrations are competing with retailers and selling on a cost basis.

Eastern Kentucky prices are quoted at around $4.25 for block; $3.75@4 for mine-run, and $3.50@4 for nut and slack. Western Kentucky quotes lump around $3; mine-run, $2.25@2.75; nut and slack, $2@2.25, all prices f.o.b. the mines.

BIRMINGHAM

Inquiries for steam grades only fair, but prices firm. Domestic market weak, retailers only providing for stock replenishment as needed. Car supply very unsatisfactory.

The continued warm weather is having a baneful effect on the local coal market, and as a result the inquiries for steam coal are not as plentiful as desired, while the spasmodic cold spells of not over two days duration, followed by a week of warm, rainy weather, is causing the domestic dealers to order very cautiously. However none of the commercial mines are suffering for lack of orders, sufficient business being in hand to warrant steady operations. Prices on steam and domestic grades are firm, quotations being from $2.50 to $3 per net ton mines on mine-run, and $3.50 to $4 on domestic lump.

Coke

CONNELLSVILLE

Spot market stronger. Another short term contract. Shipments altogether below requirements.

The spot furnace coke market continues to fluctuate rather widely. The supplies are altogether insufficient and prices paid from day to day seem to depend more upon the moods of buyers and sellers than upon anything else, as coke is always in insufficient supply. In some quarters it is believed the shipments are only about 75% of the requirements. Considerable coke has accumulated in the region but even with a good car supply this could be moved but slowly, on account of the scarcity of labor.

Last week spot furnace coke sold at $8 as minimum and $10 as maximum, the week closing with the market at $9.50@10, as quoted in this report. This week opened with sales at $9 and that seems to be about the market at this writing.

A contract for furnace coke is reported at $8.25, for 90 days beginning Jan. 20. In general there is little interest manifested in contract coke.

We quote: Spot furnace, $9; contract, $6@8.50; spot foundry, $10@10.50; contract, $8@8.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 13 at 353,192 tons, a decrease of 5384 tons, and shipments at 350,399 tons, a decrease of 4176 tons.

Buffalo—The great scarcity of all grades continues, due both to car shortage and scarcity of men. Furnaces get but a scant supply and that only by putting forth every effort to secure shipments and urging cars forward. Never has it been so difficult to obtain a sufficient amount. Quotations are based on $10 for best Connellsville foundry at the ovens, $11.85 for foundry and furnace and $9.85 for the lower grades.

Chicago—Spot coke is not available. Shipments are not sufficient to meet contract requirements. Embargoes on Eastern roads have prevented Connellsville coke reaching this territory. If free coke were available current prices would be abnormally high. Nominal quotations on free coke per net ton f.o.b. cars Chicago are said to be on the following basis:

Connellsville	$13.00@16.00
Wise County	13.00@15.00
By-Product Foundry	13.50@15.00
By-Product Domestic	11.00@13.50
Gas House	10.00@12.00

Middle Western

GENERAL REVIEW

Demand everywhere in excess of receipts. Acute shortages frequent. Prices maintained at high levels. Eastern coals extremely short.

Under the stimulus of cold weather the coal situation in the Middle Western States has been acute. The short supply was more conspicuous in Chicago and vicinity than elsewhere. By giving fuel shipments preferred movement during the latter part of last week the strain was relieved somewhat but the nearby points are now reporting shortages while Chicago is getting everything shipped from the mines. The congestion in Chicago and other large centers which has existed for some time past has now improved, and the outlook for car supply at the mines is better.

The strenuous efforts of the railroads has enabled retailers to accumulate small stocks of Western coals but the situation as to Eastern coals could not be worse. Anthracite supplies on the Lake docks have been exhausted for some time and wholesalers are depending entirely on all-rail shipments. Embargoes on nearly all the Eastern roads have almost stopped entirely the movement of hard coals to Chicago and Western points. Smokeless arrivals have been restricted to small tonnage by reason of the embargoes placed by the Norfolk & Western and Chesapeake & Ohio, but late last week these were withdrawn and smokeless shipments now in transit should soon arrive at Western points.

Car supply at Indiana and Illinois mines has been meager, and running time has averaged in the neighborhood of 50% with the result that prices generally are maintained at the previous high levels. Quotations on domestic and coarse steam sizes, as well as mine-run and screenings show little change and the difference between the coarse sizes and fine coal is not more than 50c. on the average.

The Northwestern situation is pregnant with trouble if cold weather in that section continues. At a number of points the shortage has already been severely felt, schools, public buildings and industrial plants having been shut down on account of no fuel supplies. These points are mostly in southern Minnesota and South Dakota. Shipments from this section to Northwestern points have been less than normal owing to insufficient car supply.

Fears are expressed that prices for dock coal will continue indefinitely on a high level owing to the Lake freight situation. The diversion of Lake vessels to trade on the Atlantic Ocean and failure of ship builders to increase the construction of vessels for Lake service, means that freight rates will be very high, making wholesale prices on both hard and soft coal in the Northwestern territory higher than ever before.

CHICAGO

Shortage in Chicago and vicinity acute. Industrial users calling for heavier shipments with inability to secure needed supplies. Smokeless and anthracite arrivals almost nil.

In southern Illinois the car supply continues erratic, and the wintry weather has still further handicapped the movement. The demand from Chicago territory for Franklin and Williamson County coal has been tremendous, and every effort has been made to rush supplies to Chicago. The proportion of coal shipped to Chicago has been unusually heavy. The Burlington brought 450 cars of coal into Chicago on Thursday of last week and it was estimated at the close of the week that there were 5000 cars of coal in the terminal districts of Chicago. Saline County operators have not been able to satisfy contract requirements owing to lack of cars.

Springfield district prices have shown increased strength.

Receipts of Indiana shipments in Chicago territory have been small at a time when the demand has been excessive. Movement of coal from the Indiana mines has been exceedingly slow.

Quotations in the Chicago market are as follows, per net ton f.o.b. cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$3 50@4 00	$3 50@4 00	$3 25@3.75	$3.00@3 75	$3 75@4.00
Steam lump	3 25@3 50	3 50@3 75	3 25@3.50		
Egg	3 50@4 00	3 50@4 00	3 25@3 50	3 00@3 50	3 75@4 00
Nut	3 25@3 50	3 25@3 75	3 25@3 50		
Mine-run	3 25@3 50	3 25@3 75	3 25@3 50	3 00@3 25	3.75@4.00
Screenings	3 00@3 50	3 00@3 50	3.25@3.50	3 00@3 25	3 50@3 75

	Wlmson & Franklin Cos	Saline & Harrisburg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3 75@4 00	$3 50@4 00	$5 25@6 25	No arrivals or sales	No arrivals or sales
Egg	3 75@4 00	3 50@4 00	5.25@6 25		
Nut		3 25@3 50			
No 1 nut	3 75@4 00				
No 2 nut	3 50@3 75				
No 3 nut	3 25@3 50				
No 1 washed	3 75@4 00				
No 2 washed	3 25@3 75				
Mine run	3 25@3 50	3 25@3 50	5 25@5 50		
Screenings	3 25@3 50	3 25@3 50			

Hocking Lump $3 75@4 25. Splint Lump $3 75@4 25.

Prepared sizes of smokeless coals have been much stronger than offerings of free mine-run. Prices have reached new high levels owing to the small arrivals. Embargoes on originating lines were withdrawn towards the close of last week, which means increased arrivals.

No Hocking coal was offered in this market last week, and the embargo of the Chesapeake & Ohio on splint has kept that grade out of this territory also. Eastern Kentucky coal is in much the same position and some western Kentucky grades have been shipped to Northern territory at high prices.

The anthracite situation in Chicago could not be worse. Embargoes placed by Eastern railroads against shipments to Western points have practically stopped the movement of coal from some of the mines. The demand is steady but there is no tonnage to meet it. Storage piles on local docks are gone, and dependence now rests upon all rail movement, which is most uncertain and unsatisfactory.

ST. LOUIS

The market easier due to better car supply and weather conditions. Steam demand good. Conditions in domestic market do not justify existing high prices.

Warmer weather has brought an easier condition in the local market. There is a letting up in the demand from the country except on steam coals and this has caused a certain uneasiness among the shippers as to the future of domestic sizes. The recent cold snap sent prices up almost to the former high level in the local territory, except in isolated cases, but warmer weather brought another reaction. The Standard market was more easily affected than the high-grade market, or the Mt. Olive district.

The railroads are still buying heavily in the Standard field causing a firmness that is gratifying to the operators. Steam coal is in good demand, and there was a specially heavy call the early days of the week from the Chicago market. Screenings continued to show strength and likely will from this time on. Mine-run is bringing practically the same as the domestic sizes, and in some cases screenings are bringing more. The receipts of anthracite were good during the past week and a little smokeless moved in.

The all-important problem now is that of the attitude of the railroads. The Terminal Association at St. Louis is the cause of 90% of the coal car shortage in this territory. Its utter inability to handle traffic has caused untold worry to manufacturers, retailers and consumers. An effort to eliminate the association was made during the past few years by the city and the civic organizations, but failed. At the present time local congestion is also caused to some extent by the ice in the river which has tied up all the ferries.

The retail market is just fairly good. The country prices are about from 25c. to 50c. higher than the St. Louis market, which is at the present time per net ton f.o.b. mines as follows:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6-in. lump	$3 25@3 50	$3.00@3 25	$2 50@2.75
3x6-in. egg	3 25@3 50	3 00@3 25	2 50@2.75
2x3-in. nut	3 25@3 50	3.00@3 25	2.50@2.75
No. 2 nut	3 25@3 50	.....	2 25@2.50
No. 3 nut	3 25@3.50	.....	2.25@2.50
No. 4 nut	3 25	.....	.....
No. 5 nut	3 00@3.25	.....	.....
2-in. screen	3 00@3.25	.....	2.25@2.50
2-in. lump	.....	.....	2 25@2 50
3-in. lump	.....	3 00@3 25	2 25@2 50
Steam egg	.....	3 00@3 25	2.25@2 50
Mine run	3 00@3.25	3 00@3 25	2 25@2.50
Washed			
No. 1	3 25@3 50	3 50	.....
No. 2	3 25@3.50	3 25@3 50	.....
No. 3	3 25@3.50	3 25@3.50	.....
No. 4	3 25	3 00	.....
No. 5	3 00	2 75	.....

Rate on Williamson & Franklin Co. is 72½c.
Rate on other fields is 57½c.

General Statistics

SAULT STE. MARIE CANALS

Shipments through the Sault Ste. Marie Canals for December and the season were, in short tons as follows:

	December		Season	
Anthracite	88,100	133,318	2,030,730	2,210,219
Bituminous	233,734	403,945	11,326,328	13,912,900

Note—The United States canal was opened Apr. 20 and was closed Dec. 19, 1916, season 244 days. The Canadian canal was opened Apr. 18 and closed Dec. 18, 1916, season 245 days.

VIRGINIAN RAILWAY

Shipments of coal over this road for October amounted to 586,679 short tons as compared with 519,345 tons in September.

NORFOLK & WESTERN

The following is a statement of coal handled by the N. & W. Ry. during December and the preceding two months in short tons:

	October	November	December
Pocahontas	1,501,217	1,475,740	1,335,822
Tug River	318,618	310,884	290,411
Thacker	267,376	245,621	242,020
Kenova	89,740	91,571	84,782
Clinch Valley	123,408	138,032	133,762
Miscellaneous	6,380	9,687	11,618
Total N. & W.	2,306,739	2,271,535	2,098,415
Wlm. & Pond Ck.	105,615	116,977	112,447
Tug R. & Ky. R.R.	57,202	51,436	48,653
Other roads	440,521	340,230	209,084
Grand total	2,910,077	2,780,178	2,468,599

Foreign Markets

GREAT BRITAIN

Jan. 11—Market conditions are unchanged. There is very little coal available for the open market, but on the other hand, there is little business passing, and prices are nominal.

Best Welsh steam	Nominal
Best seconds	Nominal
Seconds	$7 20@7.44
Best dry coals	6.96@7.20
Best Monmouthshires	6.96@7.20
Seconds	6.24@6.48
Best Cardiff smalls	4.80@5 04
Cargo smalls	4.32@4 56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—The volume of chartering is still of small dimensions. Tonnage is offering fairly freely, notably in the direction of the Western Islands, and rates are inclined to ease.

Gibraltar	$10.20	Port Said	$19 20
Marseilles	14 04	Las Palmas	9 00
Genoa	14 28	St. Vincent	10 20
Naples	13 80	River Plate	13 20
Alexandria	19 20		

SOUTH AFRICA

Coal production of the Union of South Africa for October, in short tons was as follows:

	Production	Sold	Value*
Transvaal	647,085	542,498	125.516
Cape	4,446	3,417	1,955
Orange Free State	80,085	68,791	17.723
Natal	359,096	274,874	98.677
Union of South Africa	1,090,712	889,580	243.871

* English pounds.

SWITZERLAND

A cable to the New York "Times" under date of Jan. 24 says:

The coal crisis arising from the decision of Germany to abrogate the convention in regard to imports, is increasing in gravity daily in Switzerland. The Political Department has decided to take a census of all stocks of fuel and any concealment will be punished by imprisonment and a fine of 20,000 francs. The Federal Council has authorized the gas plants to fix the amount of gas which each consumer may burn daily, and the iron and steel trades will henceforth be under the supervision of the Political Department.

A Berne dispatch under date of Jan. 21, said that considerable excitement had been caused throughout Switzerland by a German measure prohibiting all importations. The dispatch said that the Swiss Government would protest to Berlin as the entire economic situation of the country was affected.